JQA File No. : KL80180168R
Issue Date : August 8, 2018

TEST REPORT

Applicant	:	Onkyo Corporation
Address	:	2-1, Nisshin-Cho, Neyagawa-Shi, Osaka 572-8540, Japan
Products	:	Bluetooth Module
Model No.	:	BM875A
Serial No.	:	No.2 No.3
FCC ID	:	ATM-BM875A
Test Standard	:	CFR 47 FCC Rules and Regulations Part 15
Test Results	:	**Passed**
Date of Test	:	July 6 ~ 27, 2018

ilac-MRA VLAC Lab Accreditation VLAC-001-2

Kousei Shibata
Manager
Japan Quality Assurance Organization
KITA-KANSAI Testing Center
SAITO EMC Branch
7-3-10, Saito-asagi, Ibaraki-shi, Osaka 567-0085, Japan

- The test results in this test report was made by using the measuring instruments which are traceable to national standards of measurement in accordance with ISO/IEC 17025.
- The applicable standard, testing condition and testing method which were used for the tests are based on the request of the applicant.
- The test results presented in this report relate only to the offered test sample.
- The contents of this test report cannot be used for the purposes, such as advertisement for consumers.
- This test report shall not be reproduced except in full without the written approval of JQA.
- VLAC does not approve, certify or warrant the product by this test report.

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DEFINITIONS FOR ABBREVIATION AND SYMBOLS USED IN THIS TEST REPORT

EUT : Equipment Under Test
AE : Associated Equipment
N/A : Not Applicable
N/T : Not Tested
EMC : Electromagnetic Compatibility
EMI : Electromagnetic Interference
EMS : Electromagnetic Susceptibility

☑ - indicates that the listed condition, standard or equipment is applicable for this report.
☐ - indicates that the listed condition, standard or equipment is not applicable for this report.

1 Description of the Equipment Under Test

1.	Manufacturer	:	Onkyo Corporation 2-1, Nisshin-Cho, Neyagawa-Shi, Osaka 572-8540, Japan
2.	Products	:	Bluetooth Module
3.	Model No.	:	BM875A
4.	Serial No.	:	No.2 No.3
5.	Product Type	:	Pre-production
6.	Date of Manufacture	:	June , 2018
7.	Power Rating	:	3.3VDC
8.	Grounding	:	None
9.	Transmitting Frequency	: :	Bluetooth BDR/EDR :2402.0 MHz(00CH) – 2480.0MHz(78CH) Bluetooth LE: 2402.0 MHz(00CH) – 2480.0MHz(39CH)
10.	Receiving Frequency	: :	Bluetooth BDR/EDR :2402.0 MHz(00CH) – 2480.0MHz(78CH) Bluetooth LE: 2402.0 MHz(00CH) – 2480.0MHz(39CH)
11.	Max. RF Output Power	: :	4.49 dBm(Measure Value of Bluetooth BDR/EDR) 2.73 dBm(Measure Value of Bluetooth LE)
12.	Antenna Type	:	Chip Antenna (Integral)
13.	Antenna Gain	:	1.69 dBi
14.	Category	:	Spread Spectrum Transmitter(FHSS)/DTS
15.	EUT Authorization	:	Certification
16.	Received Date of EUT	:	July 2, 2018

17. Channel Plan

Bluetooth BDR/EDR Mode:
The carrier spacing is 1 MHz.
The carrier frequency is designated by the absolute frequency channel number (ARFCN).
The carrier frequency is expressed in the equation shown as follows:

Transmitting Frequency (in MHz) = 2402.0 + n
Receiving Frequency (in MHz) = 2402.0 + n
where, n : channel number ($0 \leq n \leq 78$)

Bluetooth Low Energy Mode:
The carrier spacing is 2 MHz.
The carrier frequency is designated by the absolute frequency channel number (ARFCN).
The carrier frequency is expressed in the equation shown as follows:

Transmitting Frequency (in MHz) = 2402.0 + 2*n
Receiving Frequency (in MHz) = 2402.0 + 2*n
where, n : channel number ($0 \leq n \leq 39$)

2 Summary of Test Results

Applied Standard : CFR 47 FCC Rules and Regulations Part 15
Subpart C – Intentional Radiators

The EUT described in clause 1 was tested according to the applied standard shown above.
Details of the test configuration is shown in clause 6.
The conclusion for the test items of which are required by the applied standard is indicated under the test result.

☑ - The test result was **passed** for the test requirements of the applied standard.

☐ - The test result was **failed** for the test requirements of the applied standard.

☐ - The test result was **not judged** the test requirements of the applied standard.

In the approval of test results,
- Determining compliance with the limits in this report was based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
- No deviations were employed from the applied standard.
- No modifications were conducted by JQA to achieve compliance to the limitations.

Reviewed by:

Shigeru Kinoshita
Assistant Manager
JQA KITA-KANSAI Testing Center
SAITO EMC Branch

Tested by:

Shigeru Osawa
Deputy Manager
JQA KITA-KANSAI Testing Center
SAITO EMC Branch

3 Test Procedure

Test Requirements : §15.247, §15.207 and §15.209

Test Procedure : ANSI C63.10–2013
Testing unlicensed wireless devices.

FCC Public Notice DA 00-705, released March 30, 2000.

KDB 414788 D01
Radiated Test Site v01r01: July 12, 2018

KDB 558074 D01
DTS Meas Guidance v04: April 5, 2017.

4 Test Location

Japan Quality Assurance Organization (JQA)
KITA-KANSAI Testing Center
7-7, Ishimaru, 1-chome, Minoh-shi, Osaka, 562-0027, Japan
SAITO EMC Branch
7-3-10, Saito-asagi, Ibaraki-shi, Osaka 567-0085, Japan

5 Recognition of Test Laboratory

JQA KITA-KANSAI Testing Center SAITO EMC Branch is accredited under ISO/IEC 17025 by following accreditation bodies and the test facility is registered by the following bodies.

VLAC Accreditation No.	:	VLAC-001-2 (Expiry date : March 30, 2020)
FCC Registration No.	:	683630
VCCI Registration No.	:	A-0002 (Expiry date : March 30, 2020)
BSMI Registration No.	:	SL2-IS-E-6006, SL2-IN-E-6006, SL2-R1/R2-E-6006, SL2-A1-E-6006 (Expiry date : September 14, 2019)
IC Registration No.	:	2079E-3, 2079E-4 (Expiry date : July 26, 2020)

Accredited as conformity assessment body for Japan electrical appliances and material law by METI. (Expiry date : February 22, 2019)

6 Description of Test Setup

6.1 Test Configuration

The equipment under test (EUT) consists of :

	Item	Manufacturer	Model No.	Serial No.	FCC ID
A	Bluetooth Module	Onkyo Corporation	BM875A	No.2 *1) No.3 *2)	ATM-BM875A

*1) Used for Antenna Conducted Emission
*2) Used for AC Powerline Conducted Emission and Field Strength of Spurious Emission

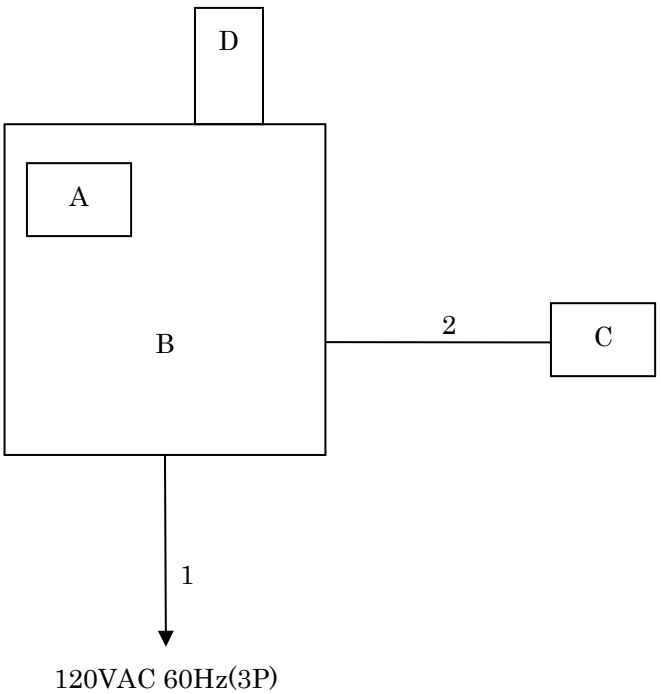
The auxiliary equipment used for testing :

	Item	Manufacturer	Model No.	Serial No.	FCC ID
B	Integrated Amplifier	ONKYO	MCA1120	0141UDP860020020	N/A
C	4 ohms Load	DALE	NH-250	8348	N/A
D	USB Memory	IO Data	G04G	1300291007	DoC

Type of Cable:

No.	Description	Identification (Manu. etc.)	Connector Shielded	Cable Shielded	Ferrite Core	Length (m)
1	AC Power Cable	--	--	NO	NO	1.8
2	Speaker Cable	--	--	NO	NO	1.5

6.2 Test Arrangement (Drawings)



6.3 Operating Condition

Power Supply Voltage : 3.3 VDC (for the Module: antenna terminal measurement)
120 VAC, 60 Hz (For Host Equipment: AC Powerline Conducted Emission and Radiated Emission)
Transmitting/Receiving

Bluetooth BDR/EDR Mode(Bluetooth 4.2 + EDR + LE):
Transmitting frequency : 2402.0 MHz(0CH) – 2480.0 MHz(78CH)
Receiver frequency : 2402.0 MHz(0CH) – 2480.0 MHz(78CH)

Bluetooth Low Energy Mode(Bluetooth 4.2 + EDR + LE):
Transmitting frequency : 2402.0 MHz(0CH) – 2480.0 MHz(39CH)
Receiver frequency : 2402.0 MHz(0CH) – 2480.0 MHz(39CH)

The test were carried under 3 mode shown as follows:
1) BDR
2) EDR
In Spurious Emissions(Conducted) and Radiated Emissions, the worst case is BDR mode.
The worst case of the Band Edge radiated emission is EDR mode.
3) LE

Modulation Type
1. DH1/ DH3/ DH5 Packet (Modulation Type : GFSK)
2. 2DH1/ 2DH3/ 2DH5 Packet (Modulation Type : pi/4-DQPSK)
3. 3DH1/ 3DH3/ 3DH5 Packet (Modulation Type : 8DPSK)
4. LE Packet (Modulation Type : GFSK)

Other Clock Frequency
26 MHz

The EUT with temporary antenna port was used in conducted measurement.

The test were carried out using the following test program supplied by applicant;
- Software Name: BlueTest3
- Software Version: 2.6.9 1584
- Storage Location: Controller PC(supplied by applicant)

7 Test Requirements

7.0 Summary of the Test Results

Test Item	FCC Specification	Reference of the Test Report	Results	Remarks
Antenna Requirement	Section 15.203	Section 1.12	Passed	-
Channel Separation	Section 15.247(a)(1)	Section 7.1	Passed	-
Minimum Hopping Channel	Section 15.247(a)(1)(iii)	Section 7.2	Passed	-
Occupied Bandwidth	Section 15.247(a)(1)	Section 7.3	Passed	-
Dwell Time	Section 15.247(a)(1)(iii)	Section 7.4	Passed	-
Peak Output Power (Conduction)	Section 15.247(b)(1)	Section 7.5	Passed	-
Peak Power Density (Conduction)	Section 15.247(e)	Section 7.6	Passed	-
Spurious Emissions (Conduction)	Section 15.247(d)	Section 7.7	Passed	-
AC Powerline Conducted Emission	Section 15.207	Section 7.8	Passed	-
Radiated Emission	Section 15.247(d)	Section 7.9	Passed	-
RF Exposure	Section 15.247(i)	Section 7.10	Passed	

7.1 Channel Separation

For the requirements, ☑ - Applicable [☑ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

7.1.1 Test Results

For the standard, ☑ - **Passed** ☐ - **Failed** ☐ - **Not judged**

Channel Separation is 1.000 MHz
Channel Separation (Inquiry) is 2.000 MHz

Uncertainty of Measurement Results ± 0.9 %(2σ)

Remarks : _____

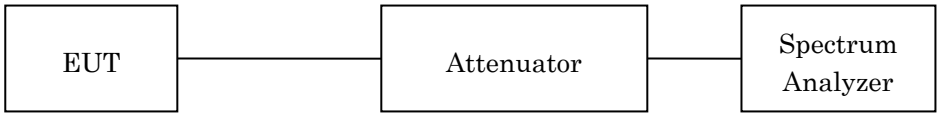
7.1.2 Test Instruments

Shielded Room S4				
Type	**Model**	**Serial No. (ID)**	**Manufacturer**	**Cal. Due**
Spectrum Analyzer	E4446A	US44300388 (A-39)	Agilent	2019/03/27
Attenuator	54A-10	W5675 (D-28)	Weinschel	2018/08/14
RF Cable	SF102	14253/2 (C-52)	HUBER+SUHNER	2018/08/14

NOTE : The calibration interval of the above test instruments is 12 months.

7.1.3 Test Method and Test Setup (Diagrammatic illustration)

The test system is shown as follows:



The setting of the spectrum analyzer are shown as follows:

Res. Bandwidth	100 kHz
Video Bandwidth	300 kHz
Span	3 MHz / 5 MHz
Sweep Time	AUTO
Trace	Maxhold

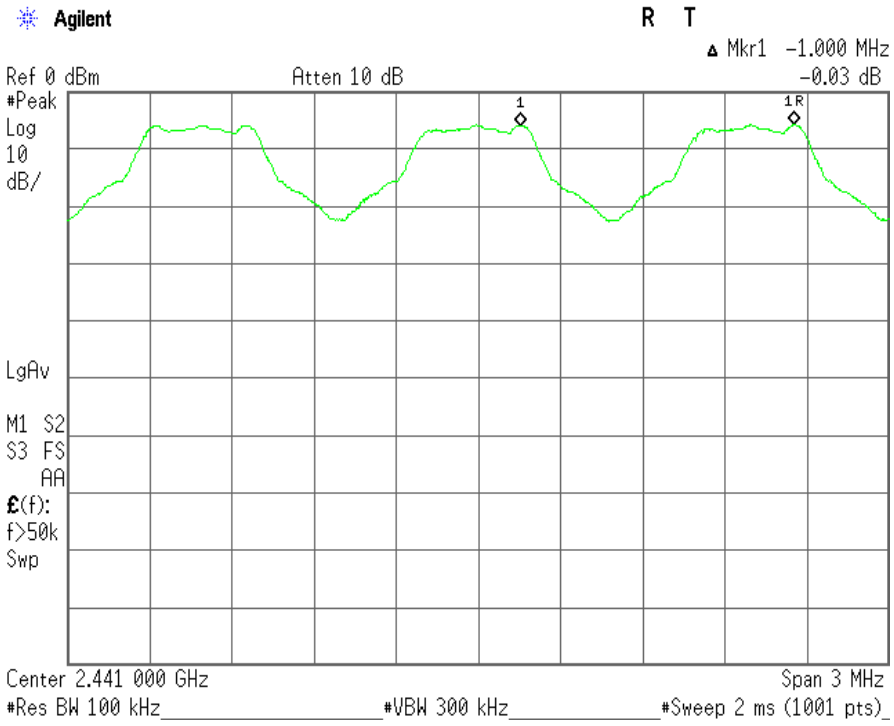
7.1.4 Test Data

Test Date :July 6, 2018
Temp.:25°C, Humi.:76%, Atm.:992hPa

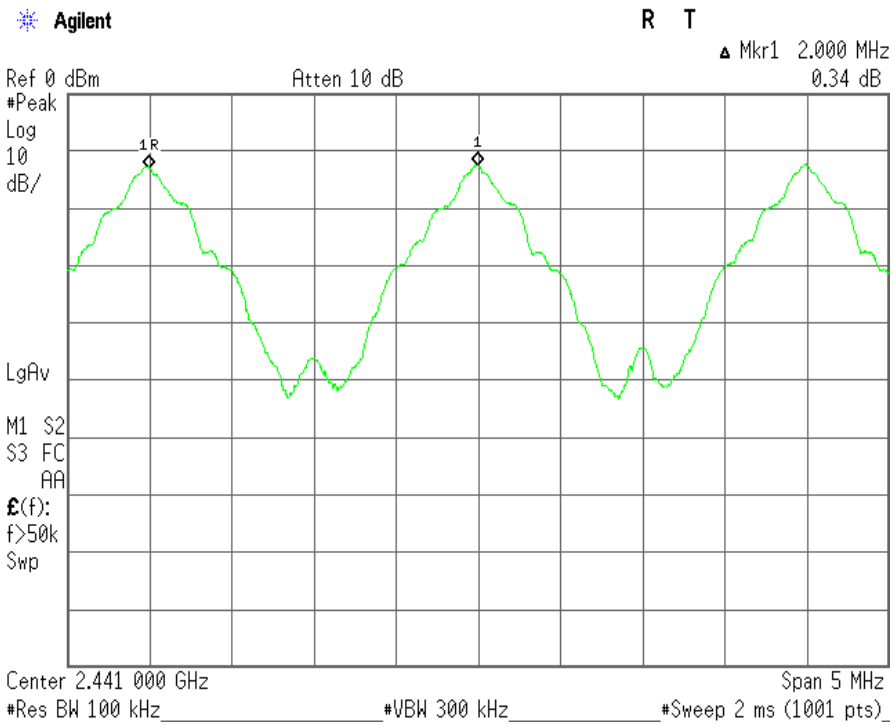
Mode of EUT	Channel Separation (MHz)	Limit* (MHz)
Hopping	1.000	0.892
Inquiry	2.000	0.543

Note: Two-thirds of the maximum 20 dB bandwidth of the hopping channel or 25 kHz (whichever is greater). Refer to the section 7.3.

Mode of EUT : Hopping



Mode of EUT : Inquiry



7.2 Minimum Hopping Channel

For the requirements, ☑ - Applicable [☑ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

7.2.1 Test Results

For the standard, ☑ - **Passed** ☐ - **Failed** ☐ - **Not judged**

Number of Channel is 79
Number of Channel (Inquiry) is 32
Number of Channel (AFH) is 20

Remarks : _____

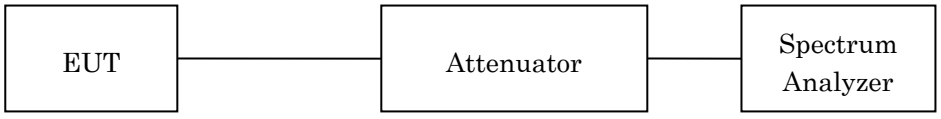
7.2.2 Test Instruments

Shielded Room S4				
Type	**Model**	**Serial No. (ID)**	**Manufacturer**	**Cal. Due**
Spectrum Analyzer	E4446A	US44300388 (A-39)	Agilent	2019/03/27
Attenuator	54A-10	W5675 (D-28)	Weinschel	2018/08/14
RF Cable	SF102	14253/2 (C-52)	HUBER+SUHNER	2018/08/14

NOTE : The calibration interval of the above test instruments is 12 months.

7.2.3 Test Method and Test Setup (Diagrammatic illustration)

The test system is shown as follows:



The setting of the spectrum analyzer are shown as follows:

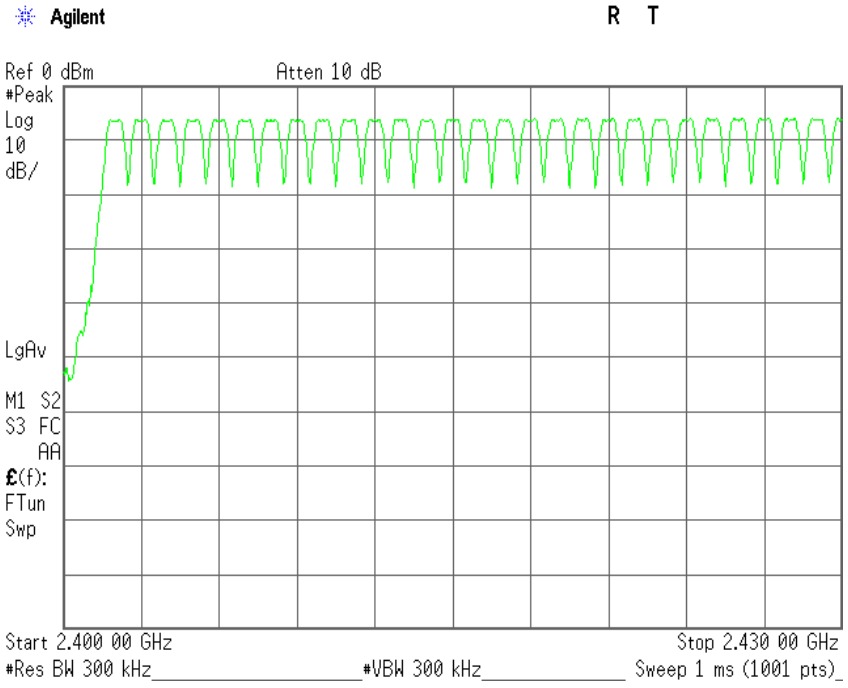
Res. Bandwidth	300 kHz
Video Bandwidth	300 kHz
Span	30 MHz
Sweep Time	AUTO
Trace	Maxhold

7.2.4 Test Data

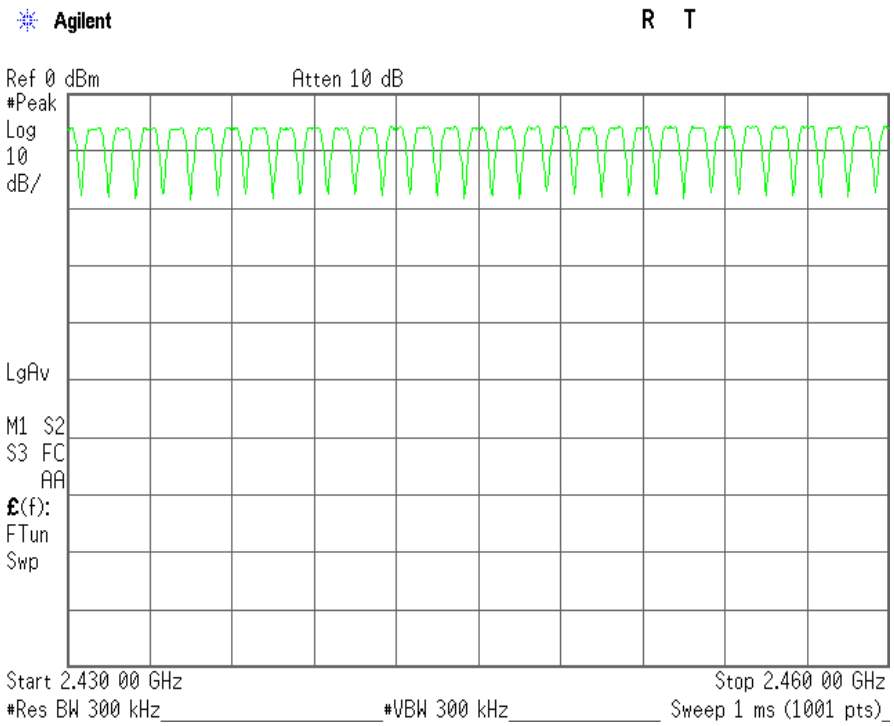
Test Date :July 6, 2018
Temp.:25°C, Humi.:76%, Atm.:992hPa

Mode of EUT	Minimum Hopping Channel	Limit
Hopping	79	15
Inquiry	32	15
AFH(minimum)	20	15

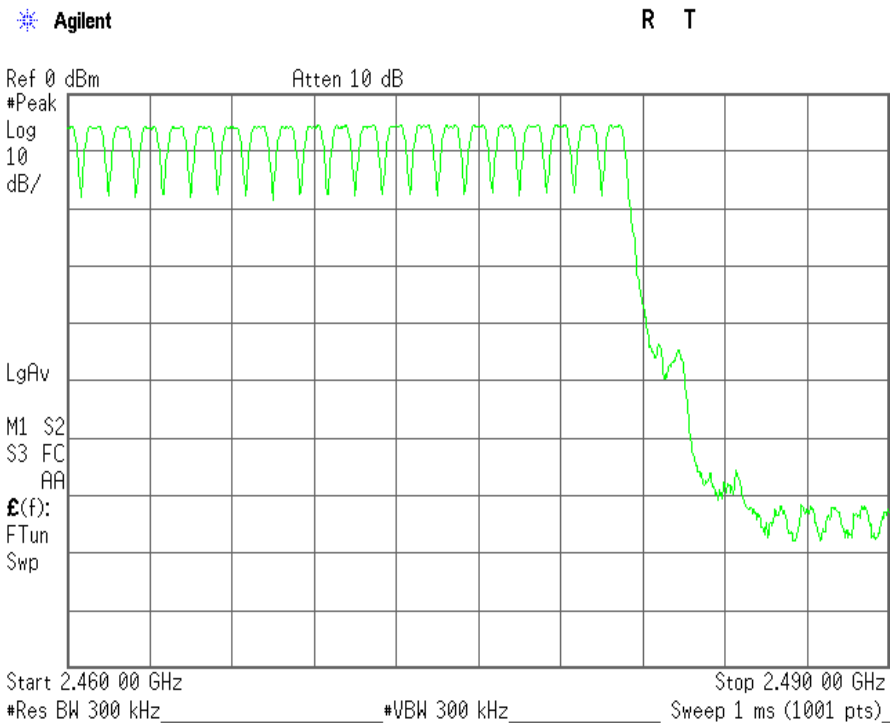
Mode of EUT : Hopping(1/3)



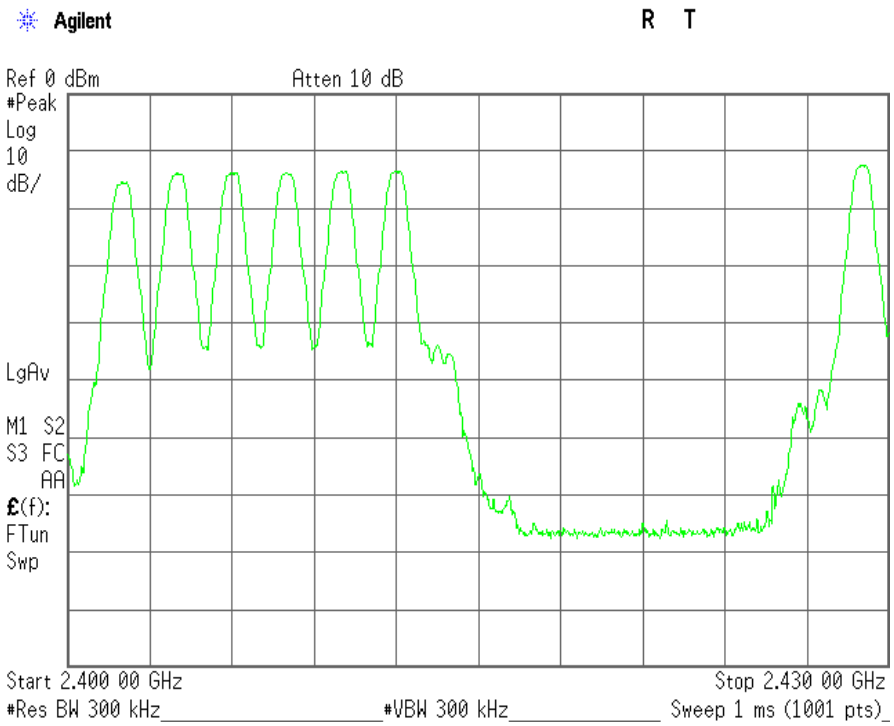
Mode of EUT : Hopping(2/3)



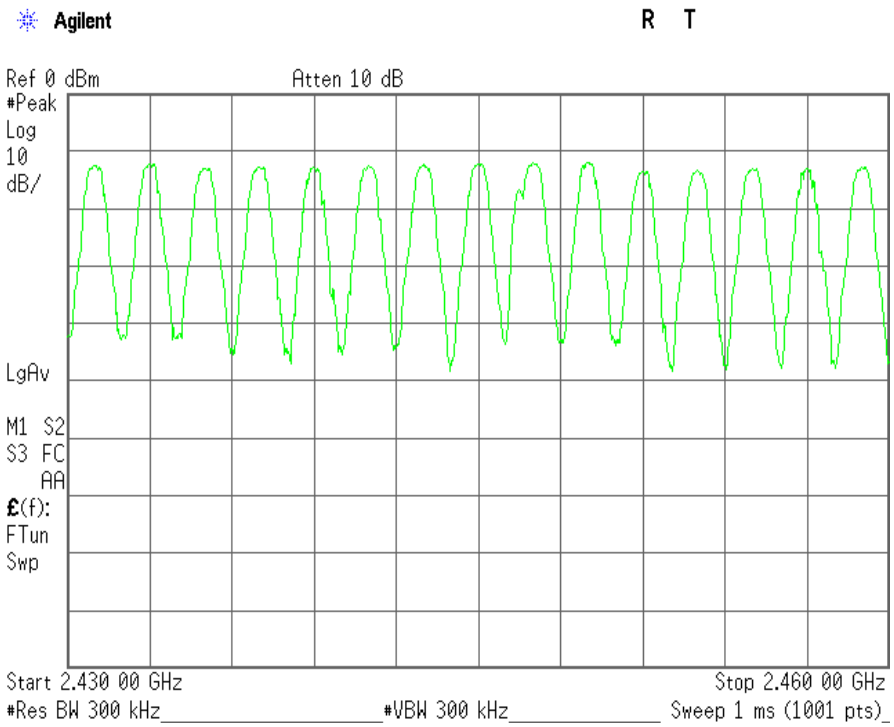
Mode of EUT : Hopping(3/3)



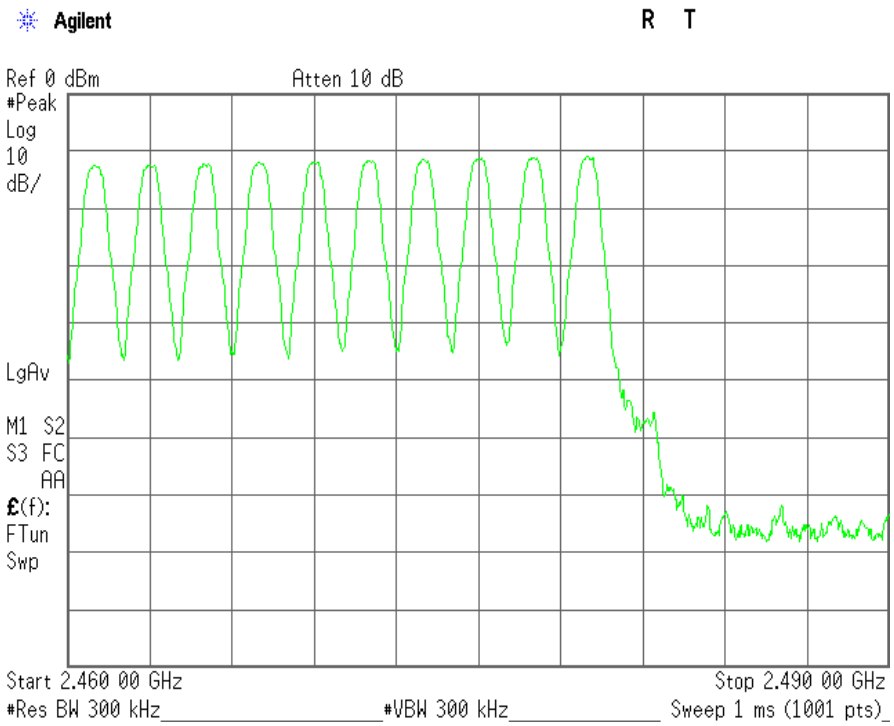
Mode of EUT : Inquiry(1/3)



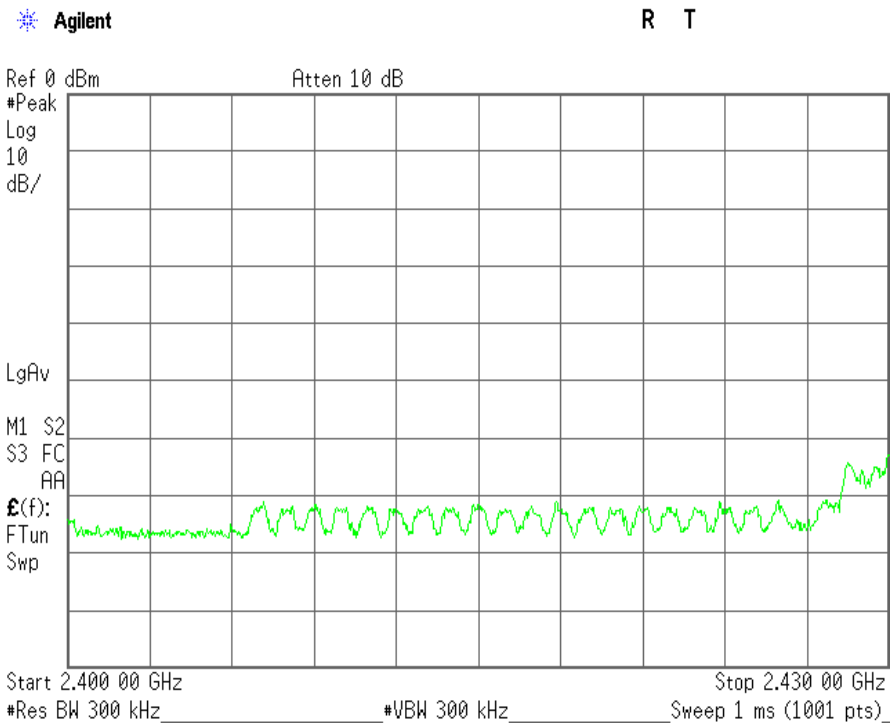
Mode of EUT : Inquiry(2/3)



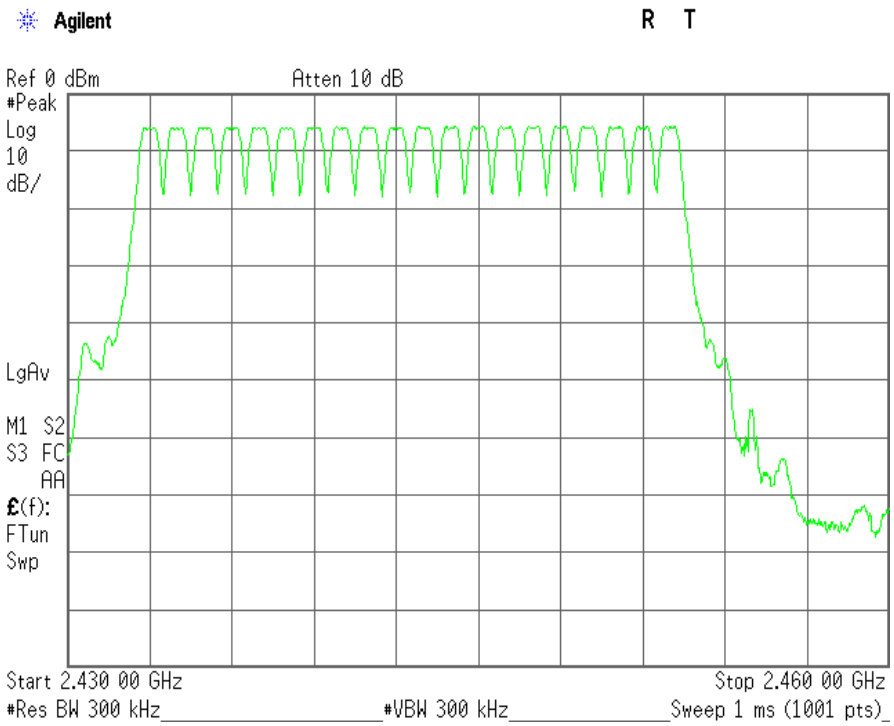
Mode of EUT : Inquiry(3/3)



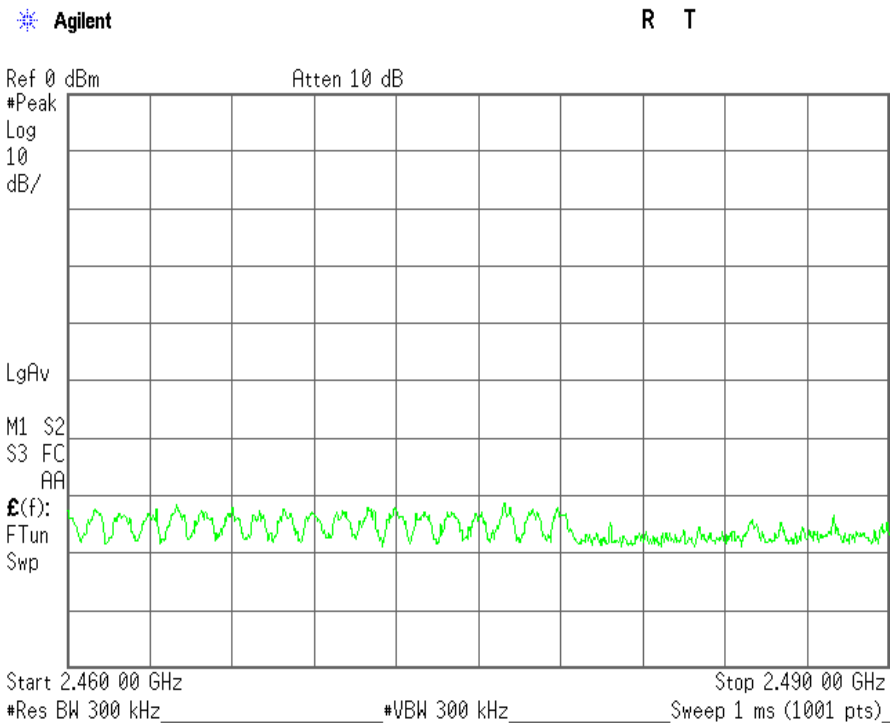
Mode of EUT : AFH(minimum)(1/3)



Mode of EUT : AFH(minimum) (2/3)



Mode of EUT : AFH(minimum) (3/3)



7.3 Occupied Bandwidth

For the requirements, ☑ - Applicable [☑ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

7.3.1 Test Results

For the standard, ☑ - **Passed** ☐ - **Failed** ☐ - **Not judged**

The 99% Bandwidth of Bluetooth BDR/EDR is 1519.8 kHz at 2480.0 MHz
The 99% Bandwidth of Bluetooth LE is 1037.2 kHz at 2440.0 MHz

The 20dB Bandwidth is Bluetooth BDR/EDR 1337.0 kHz at 2480.0 MHz
The 6dB Bandwidth of Bluetooth LE is 710.0 kHz at 2480.0 MHz

Uncertainty of Measurement Results ± 0.9 %(2σ)

Remarks :

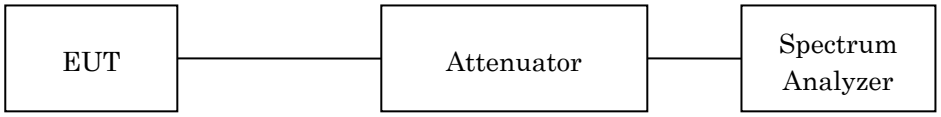
7.3.2 Test Instruments

Shielded Room S4				
Type	**Model**	**Serial No. (ID)**	**Manufacturer**	**Cal. Due**
Spectrum Analyzer	E4446A	US44300388 (A-39)	Agilent	2019/03/27
Attenuator	54A-10	W5675 (D-28)	Weinschel	2018/08/14
RF Cable	SF102	14253/2 (C-52)	HUBER+SUHNER	2018/08/14

NOTE : The calibration interval of the above test instruments is 12 months.

7.3.3 Test Method and Test Setup (Diagrammatic illustration)

The test system is shown as follows:



The setting of the spectrum analyzer are shown as follows:

	Bluetooth BDR/EDR	Bluetooth LE
Res. Bandwidth	30	*1
Video Bandwidth	≥ 3 × RBW	≥ 3 × RBW
Span	2 MHz / 3 MHz	3 MHz
Sweep Time	AUTO	AUTO
Trace	Maxhold	Maxhold

*1) For 6dB Bandwidth measurement, RBW is set to 100 kHz. For 99% Bandwidth measurement, RBW is set to the range of 1 % to 5 % of the occupied bandwidth.

7.3.4 Test Data

Mode of EUT : BDR+EDR

Test Date :July 6, 2018
Temp.:25°C, Humi.:76%, Atm.:992hPa

The resolution bandwidth was set to 1 - 5% of emission bandwidth, -20dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

1)Packet Setting : DH5(Modulation type : GFSK)

Channel	Frequency (MHz)	99% Bandwidth (kHz)	-20dBc Bandwidth (kHz)	Two-thirds of the 20 dB bandwidth (kHz)
00	2402.0	867.2	937.5	625.0
39	2441.0	866.3	936.6	624.4
78	2480.0	872.7	936.5	624.3

2)Packet Setting : 2DH5(Modulation type : pi/4-DQPSK)

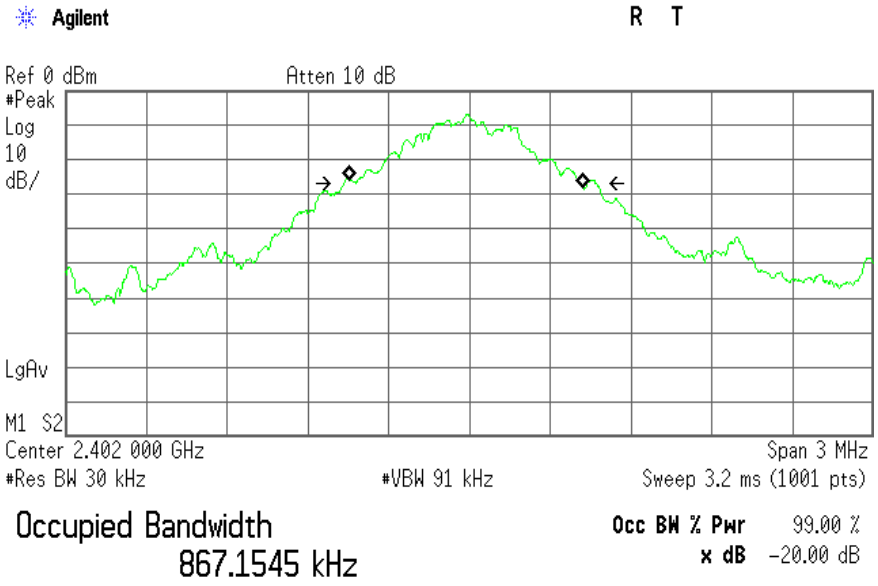
Channel	Frequency (MHz)	99% Bandwidth (kHz)	-20dBc Bandwidth (kHz)	Two-thirds of the 20 dB bandwidth (kHz)
00	2402.0	1209.9	1241.0	827.3
39	2441.0	1329.1	1280.0	853.3
78	2480.0	1519.8	1337.0	891.3

3)Packet Setting : 3DH5(Modulation type : 8DPSK)

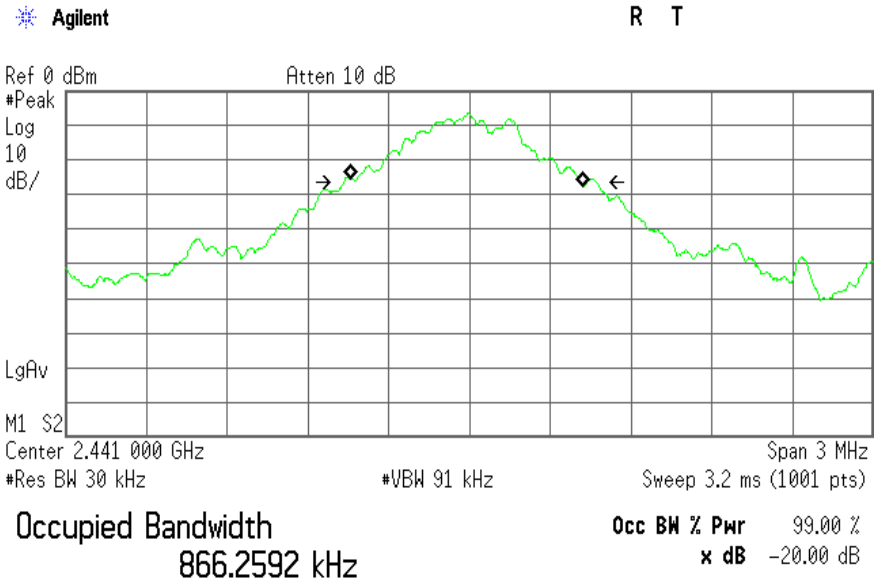
Channel	Frequency (MHz)	99% Bandwidth (kHz)	-20dBc Bandwidth (kHz)	Two-thirds of the 20 dB bandwidth (kHz)
00	2402.0	1209.9	1270.0	846.7
39	2441.0	1286.6	1276.0	850.7
78	2480.0	1424.2	1306.0	870.7

1)Packet Setting : DH5(Modulation type : GFSK)

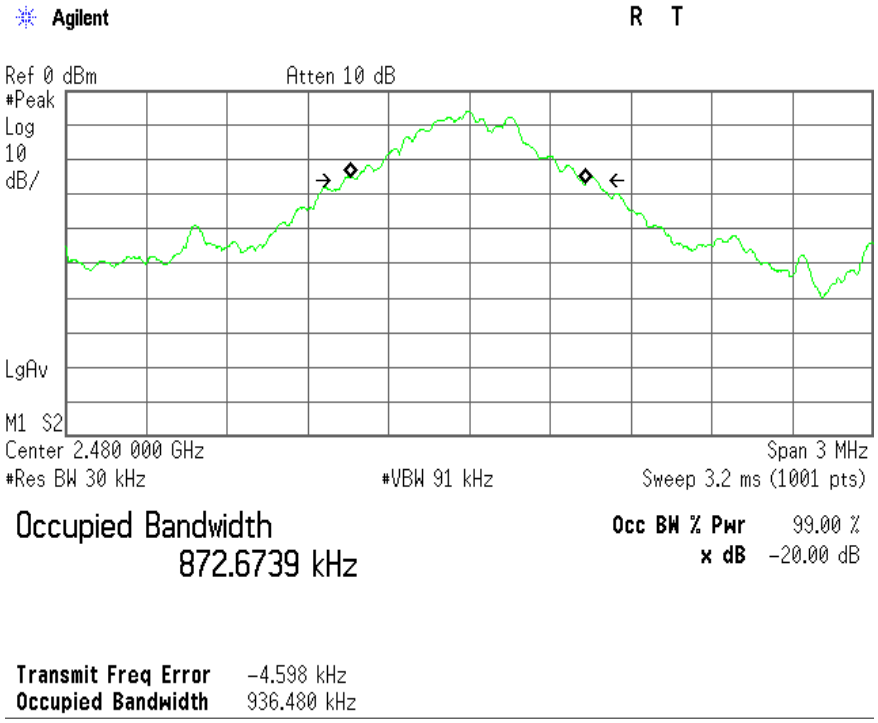
Low Channel



Middle Channel

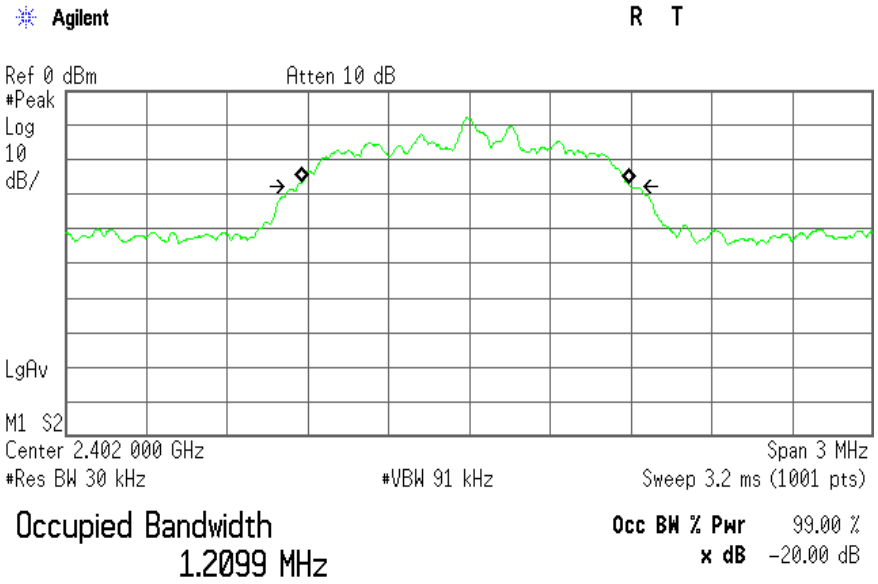


High Channel

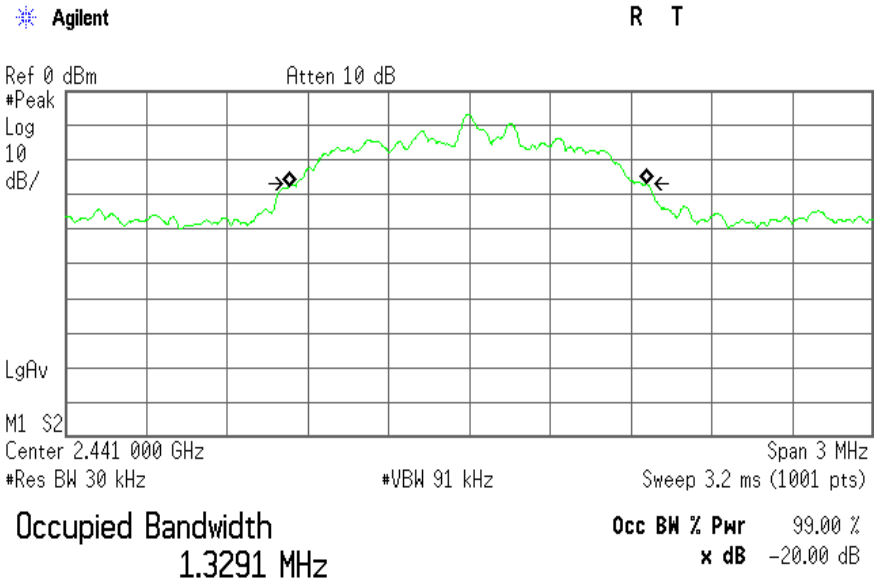


2)Packet Setting : 2DH5(Modulation type : pi/4-DQPSK)

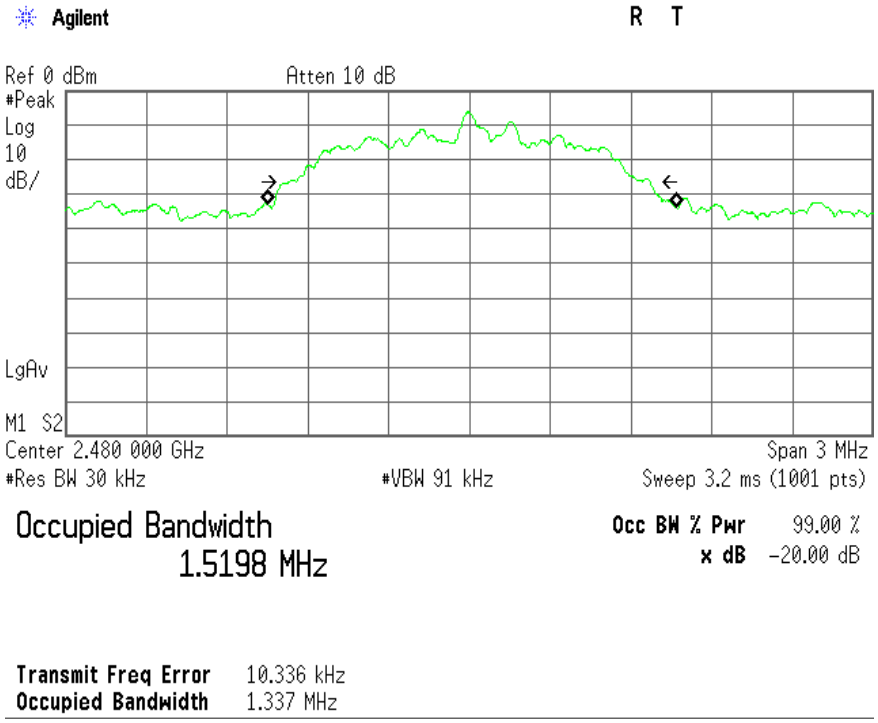
Low Channel



Middle Channel

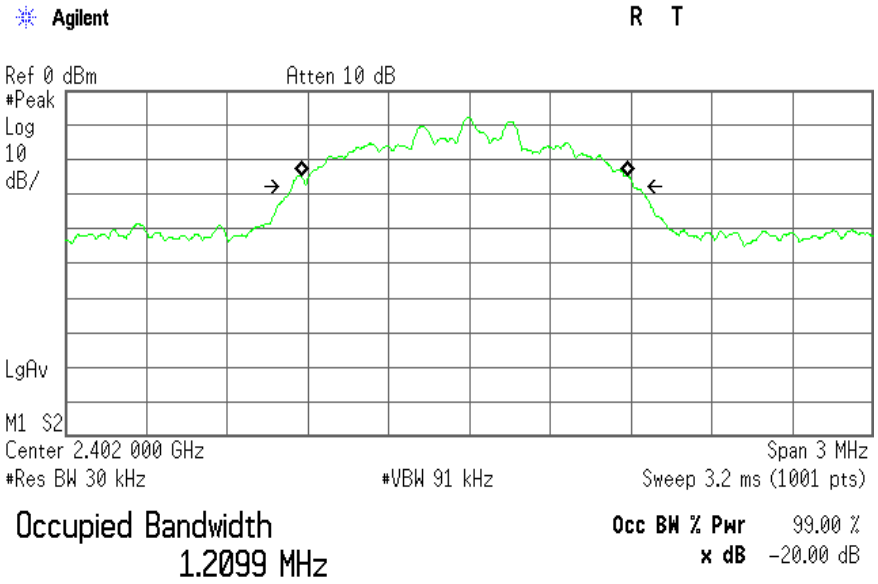


High Channel

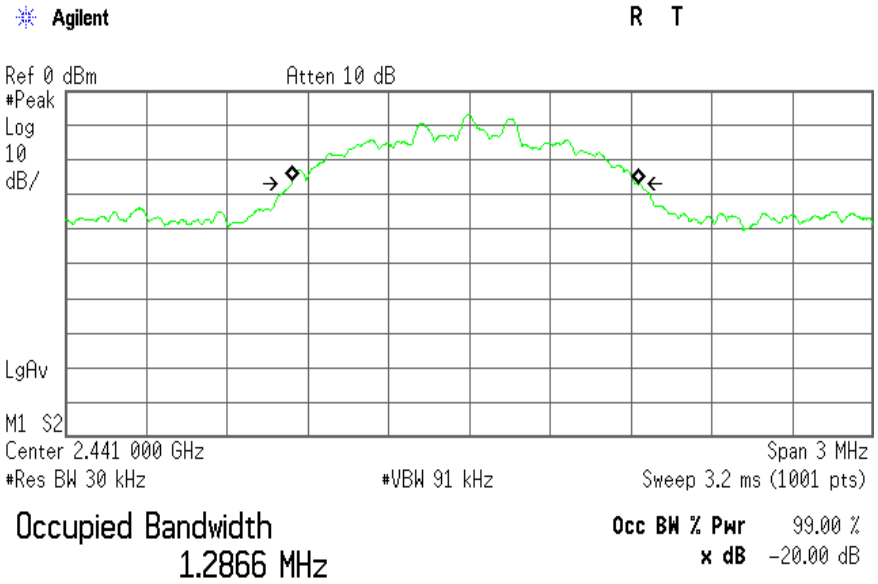


3)Packet Setting : 3 DH5(Modulation type : 8DPSK)

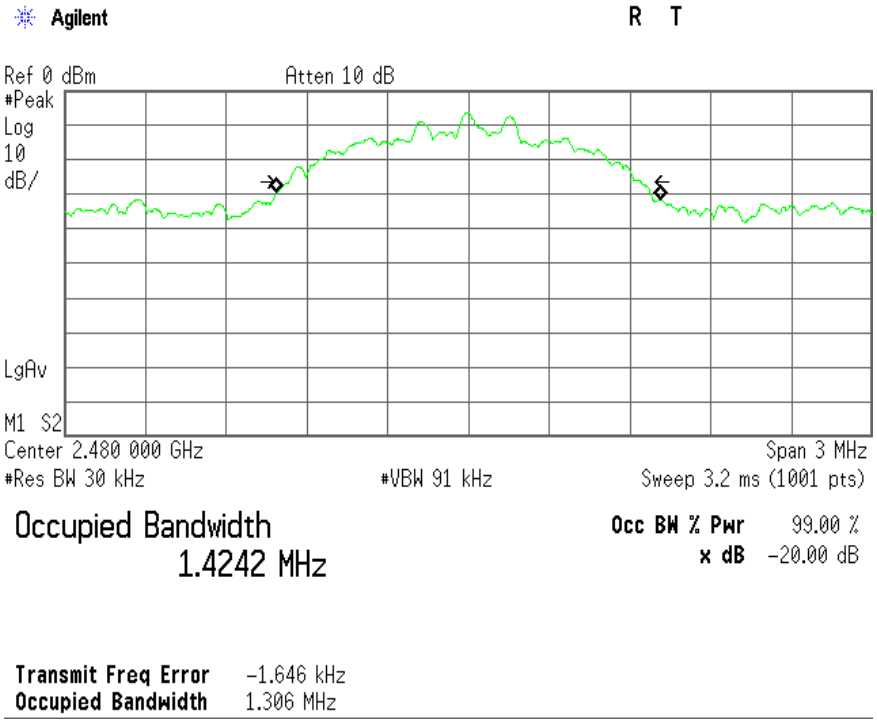
Low Channel



Middle Channel



High Channel



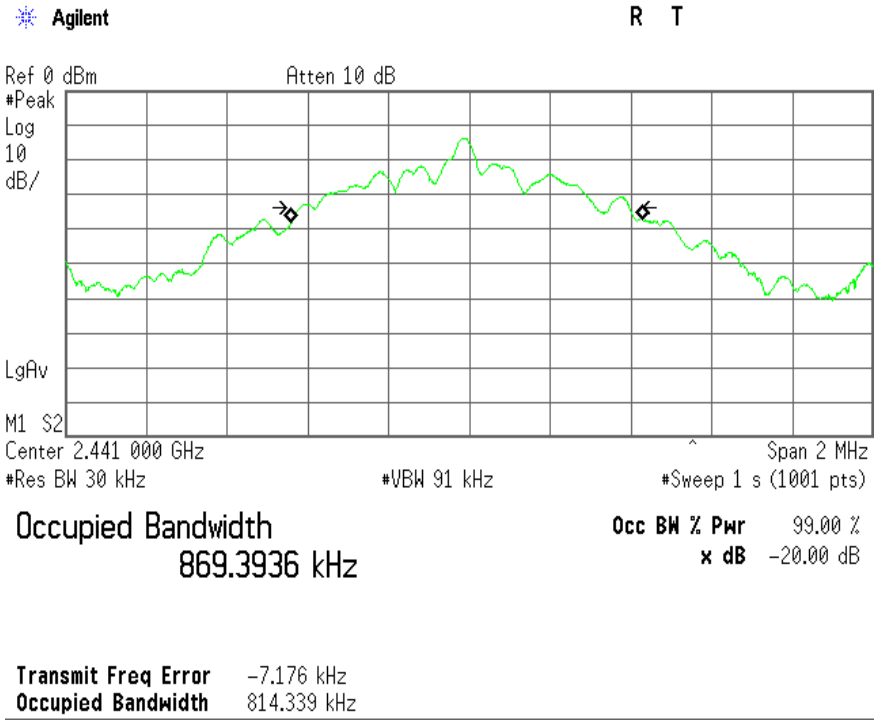
Mode of EUT : Inquiry

Test Date :July 6, 2018
Temp.:25°C, Humi.:76%, Atm.:992hPa

The resolution bandwidth was set to 1- 5 % of emission bandwidth, -20dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

Frequency (MHz)	99% Bandwidth (kHz)	-20dBc Bandwidth (kHz)	Two-thirds of the 20 dB bandwidth (kHz)
2441.0	869.4	814.3	542.9

Middle Channel



Mode of EUT : Bluetooth Low Energy

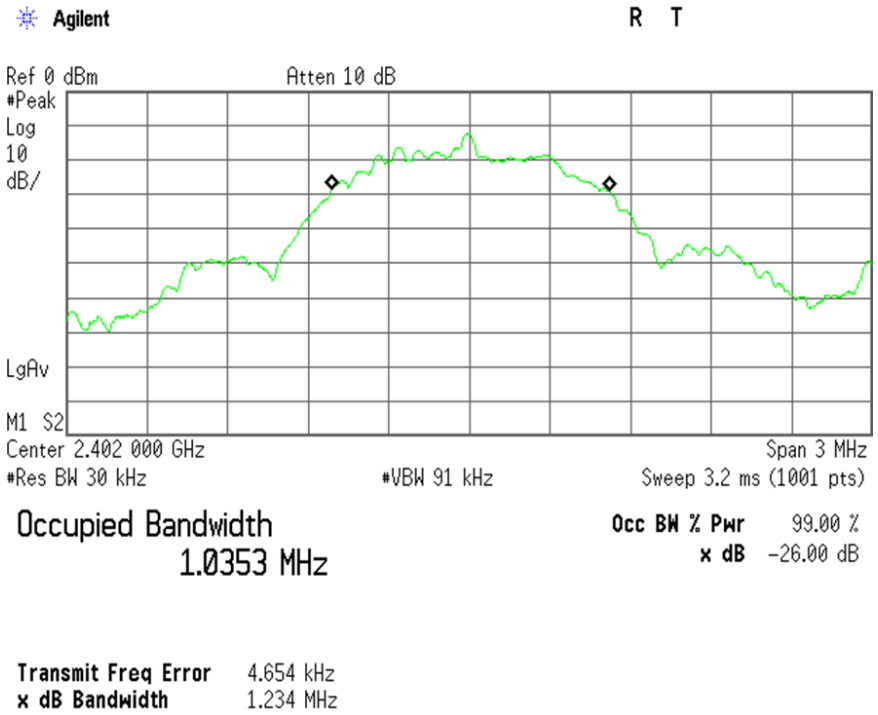
Test Date :July 6, 2018
Temp.:25°C, Humi.:76%, Atm.:992hPa

The resolution bandwidth was set to 100 kHz (for 6dB BW) or 1 - 5% of emission bandwidth (for 99% BW), -6dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

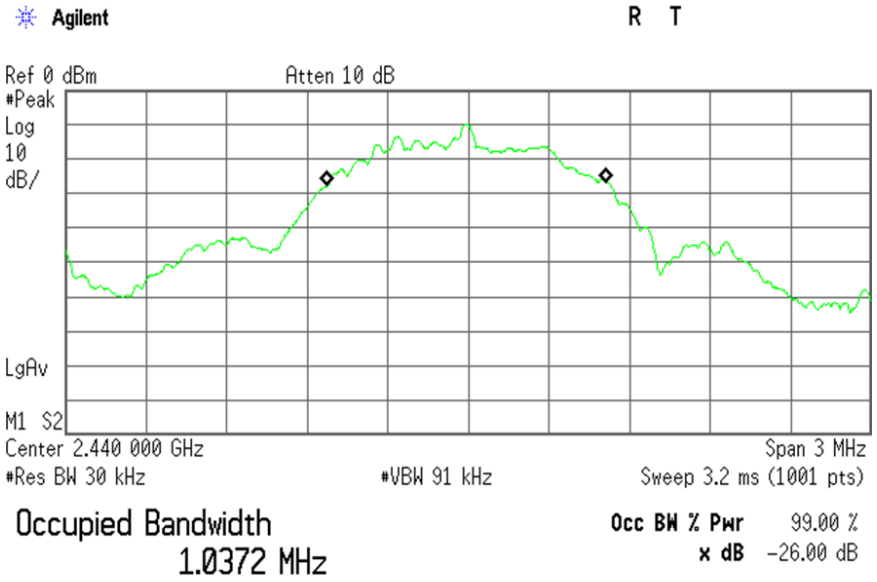
1)Packet Setting : LE (Modulation type : GFSK)

Channel	Frequency (MHz)	99% Bandwidth (kHz)	-6dBc Bandwidth (kHz)	Minimum -6dBc Bandwidth Limit (kHz)
00	2402.0	1035.3	707.6	500
19	2440.0	1037.2	702.1	500
39	2480.0	1034.4	710.0	500

1)Packet Setting : LE (Modulation type : GFSK)
Low Channel (99% Bandwidth)

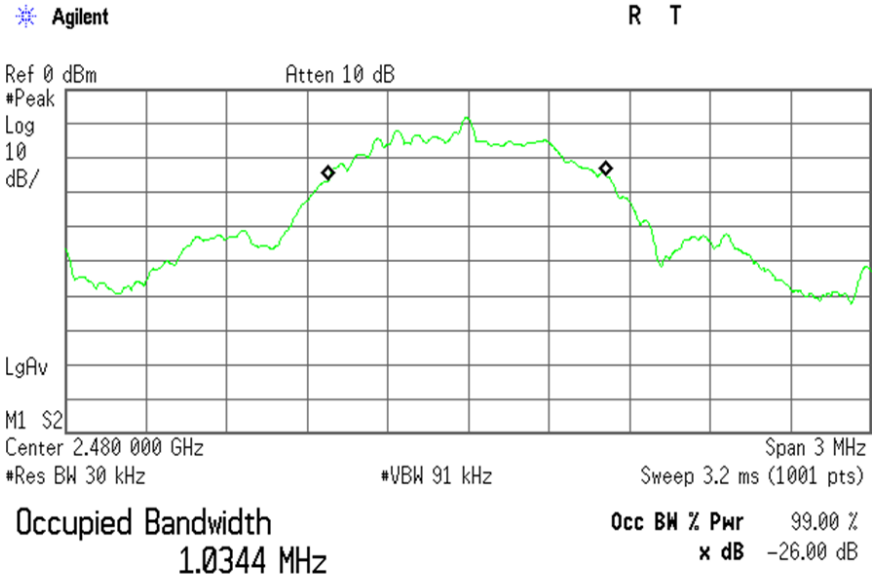


Middle Channel (99 % Bandwidth)



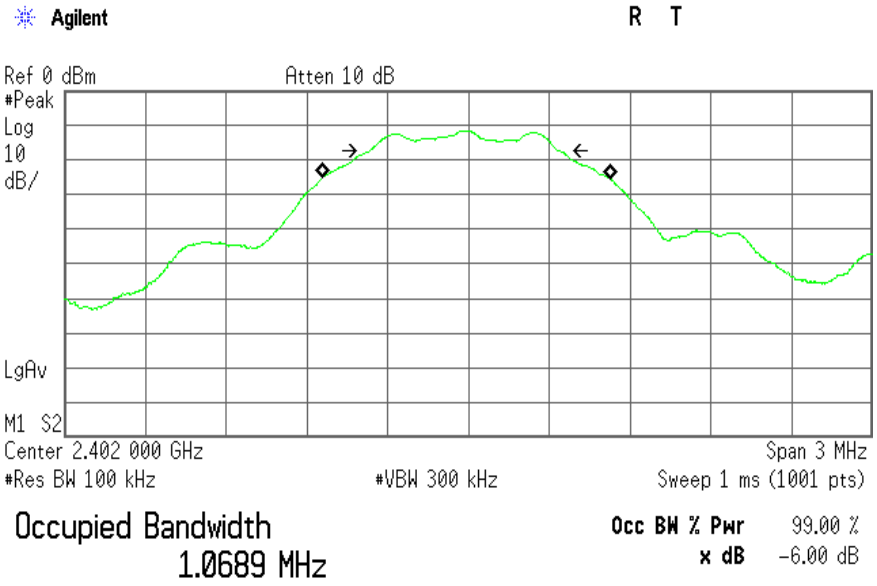
Transmit Freq Error	-6.584 kHz
x dB Bandwidth	1.234 MHz

High Channel (99 % Bandwidth)



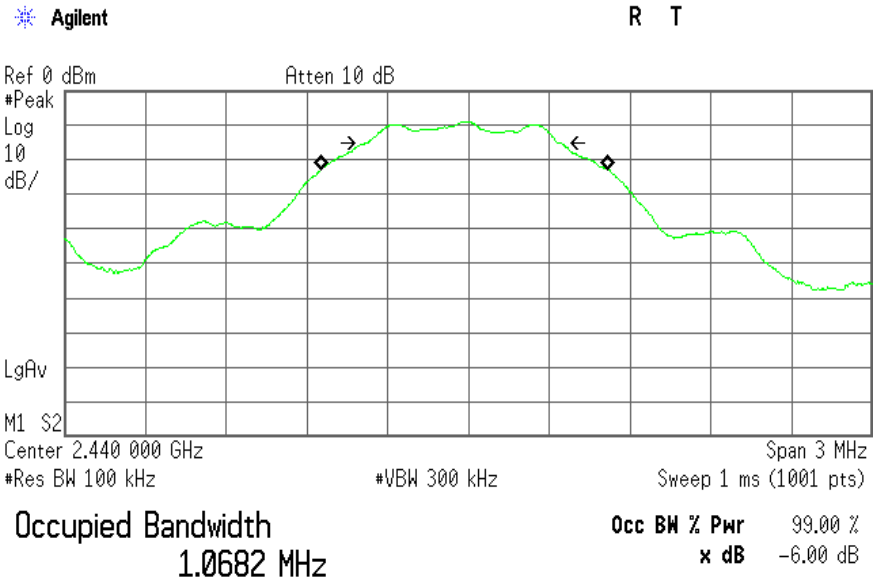
Transmit Freq Error	-4.437 kHz
x dB Bandwidth	1.238 MHz

Low Channel (-6dBc Bandwidth)



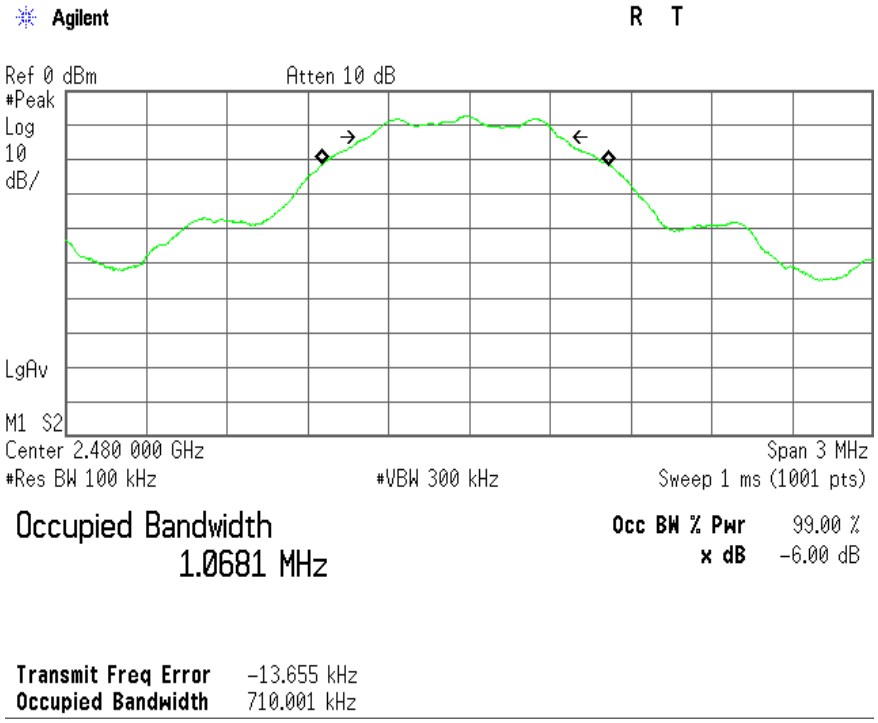
Transmit Freq Error	-5.601 kHz
Occupied Bandwidth	707.553 kHz

Middle Channel (-6dBc Bandwidth)



Transmit Freq Error	-15.780 kHz
Occupied Bandwidth	702.114 kHz

High Channel (-6dBc Bandwidth)



7.4 Dwell Time

For the requirements, ☑ - Applicable [☑ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

7.4.1 Test Results

For the standard, ☑ - **Passed** ☐ - **Failed** ☐ - **Not judged**

Dwell Time is 308.9 msec
Dwell Time (Inquiry) is 65.2 msec
Dwell Time (AFH) is 154.5 msec

Uncertainty of Measurement Results ± 0.6 %(2σ)

Remarks : _____

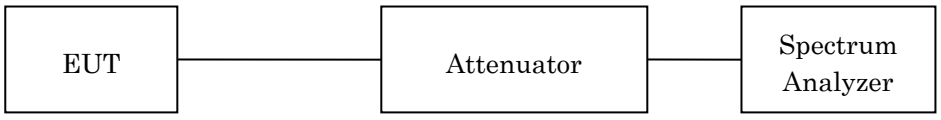
7.4.2 Test Instruments

Shielded Room S4				
Type	**Model**	**Serial No. (ID)**	**Manufacturer**	**Cal. Due**
Spectrum Analyzer	E4446A	US44300388 (A-39)	Agilent	2019/03/27
Attenuator	54A-10	W5675 (D-28)	Weinschel	2018/08/14
RF Cable	SF102	14253/2 (C-52)	HUBER+SUHNER	2018/08/14

NOTE : The calibration interval of the above test instruments is 12 months.

7.4.3 Test Method and Test Setup (Diagrammatic illustration)

The test system is shown as follows:



The setting of the spectrum analyzer are shown as follows:

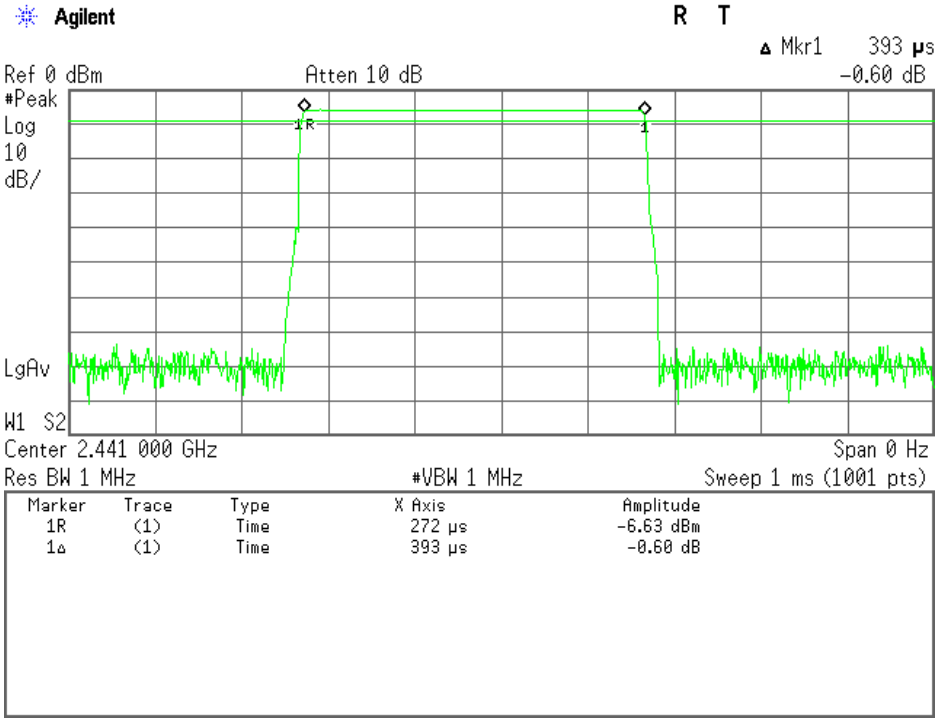
Res. Bandwidth	1 MHz
Video Bandwidth	1 MHz
Span	Zero Span

7.4.4 Test Data

Test Date :July 6, 2018
Temp.:25°C, Humi.:76%, Atm.:992hPa

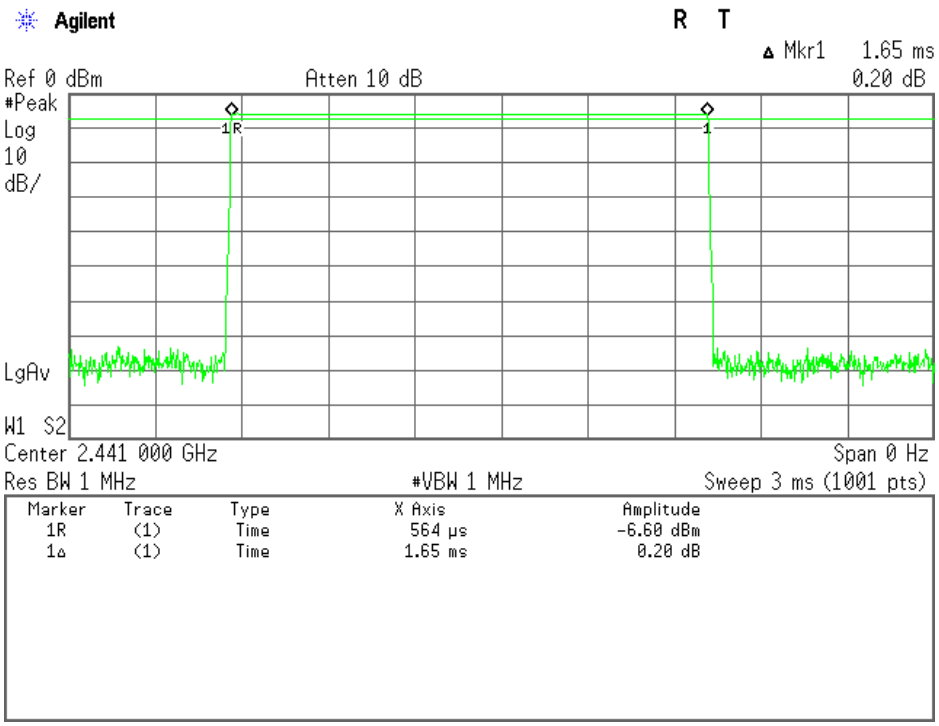
Mode of EUT	Dwell Time (msec)	Limit (msec)
DH1	125.8	400
DH3	264.0	400
DH5	308.9	400
Inquiry	65.2	400

DH1(Modulation type : GFSK)



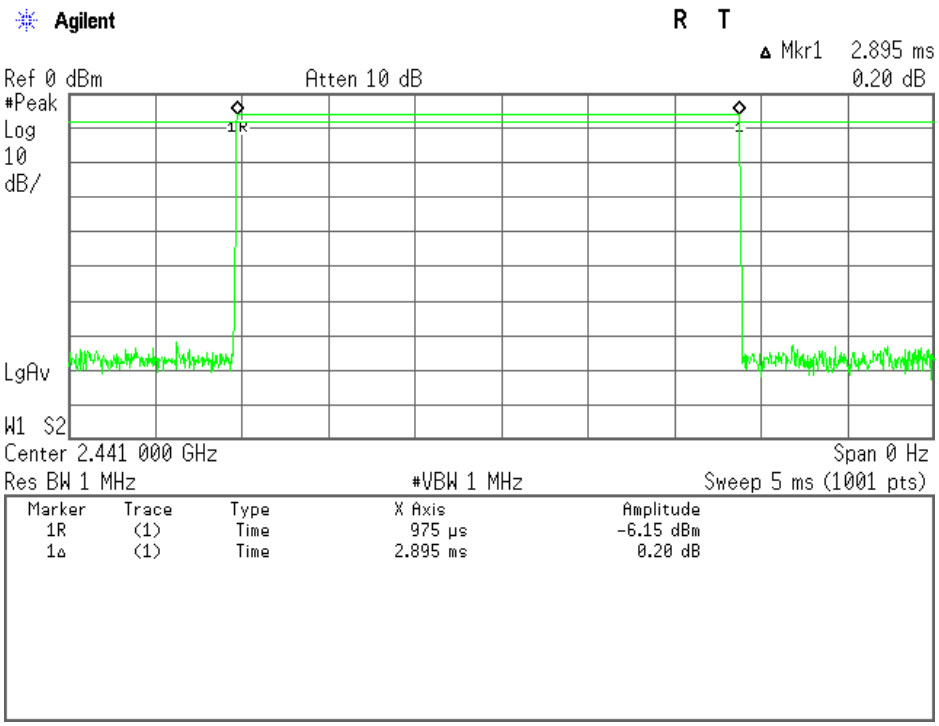
Note : The system makes worst case 1600 hops per second or 1 time slot has a length of 625 µs with 79 channels. A DH1 Packet need 1 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 800 hops per second with 79 channels. So the system has each channel 10.1266 times per second and so for 31.6 seconds the system have 320.0 times of appearance.
Each tx-time per appearance is 0.393 ms.
Dwell time = 320.0 * 0.393 = 125.8 ms

DH3(Modulation type : GFSK)



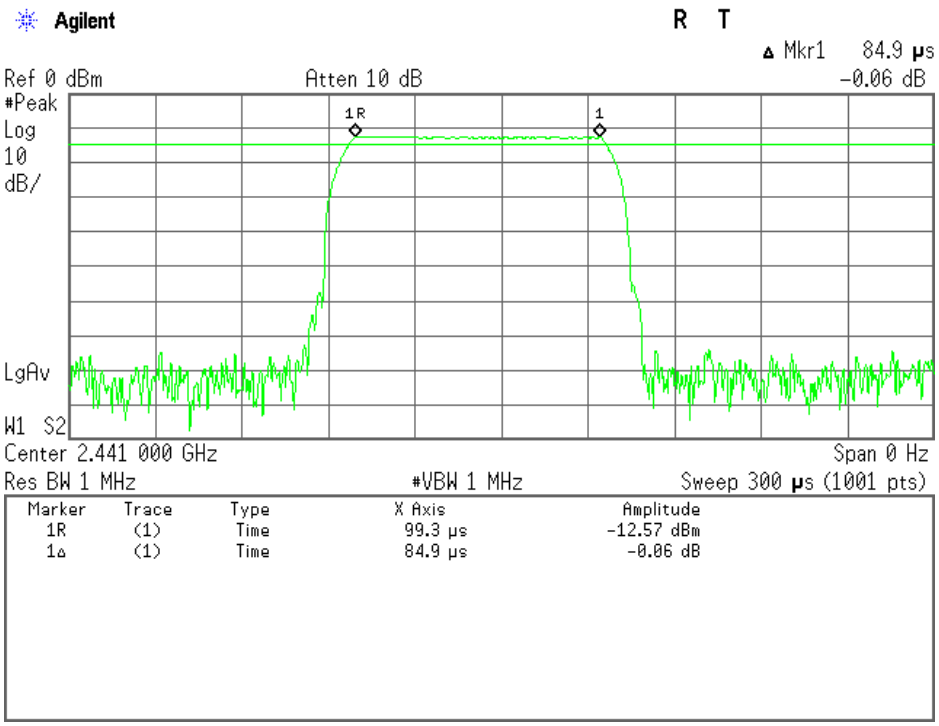
Note : A DH3 Packet need 3 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 400 hops per second with 79 channels. So the system have each channel 5.063 times per second and so for 31.6 seconds the system have 160.0 times of appearance.
Each tx-time per appearance is 1.650 ms.
Dwell time = 160.0 * 1.650 = 264.0 ms

DH5(Modulation type : GFSK)



Note : A DH5 Packet need 5 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 266.667 hops per second with 79 channels. So the system have each channel 3.3755 times per second and so for 31.6 seconds the system have 106.7 times of appearance.
Each tx-time per appearance is 2.895 ms.
Dwell time = 106.7 * 2.895 = 308.9 ms

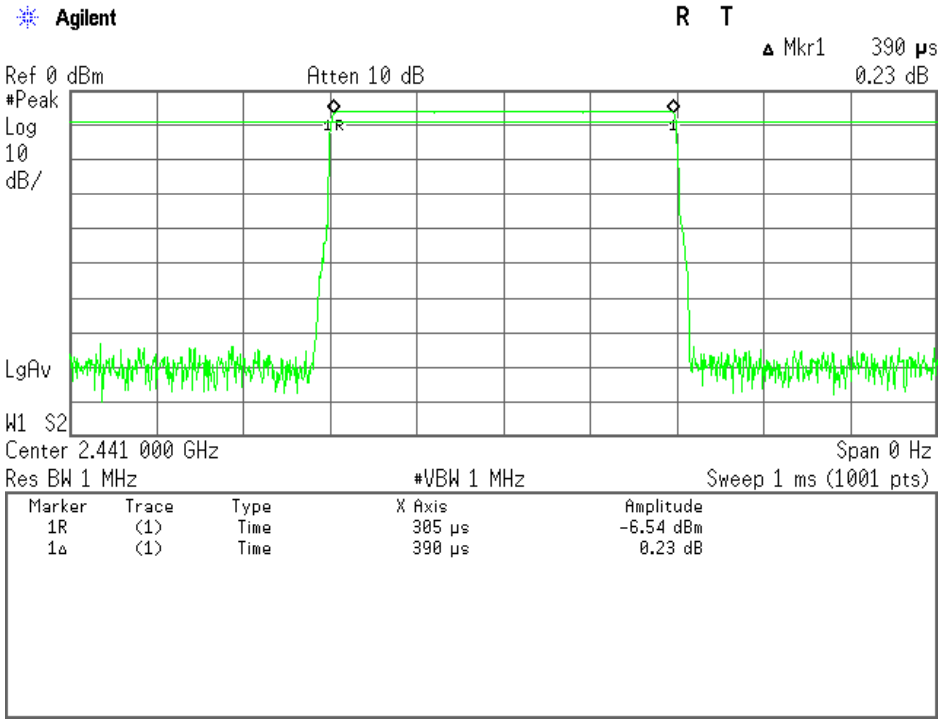
Inquiry



Note : The system have 32 hopping channel in Inquiry mode.
The time period = 32 * 0.4 = 12.8 seconds
In maximum case the Bluetooth system have three blocks of 2560 ms in 12.8 s period. One block has 256 burst at each hopping channel.
Each tx-time per appearance is 0.0849 ms.
Dwell time = 0.0849 * 256 * 3 = 65.2 ms

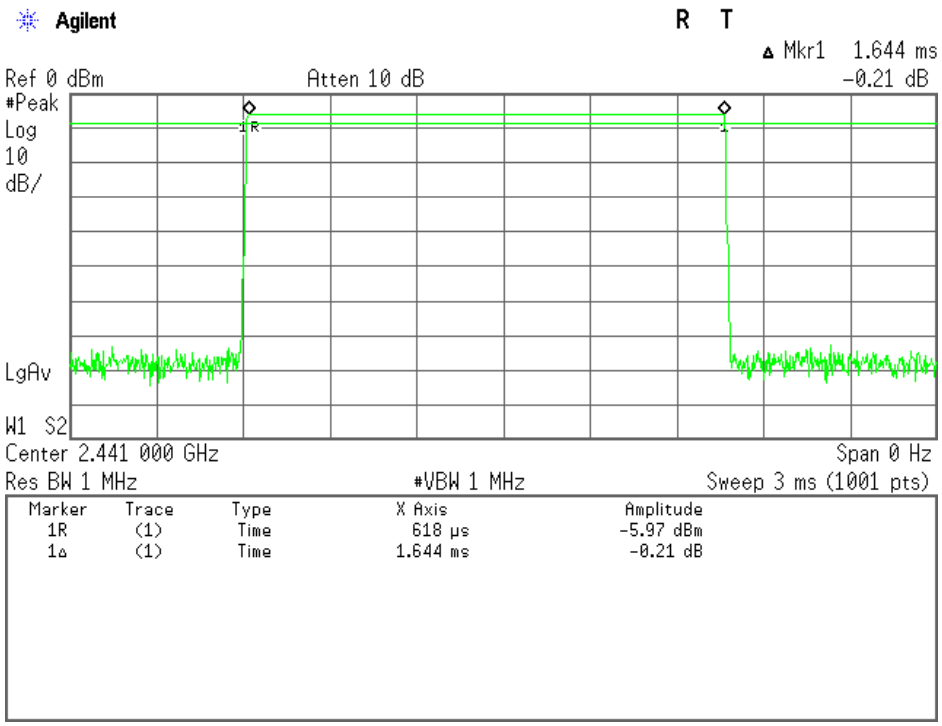
Mode of EUT	Dwell Time (msec)	Limit (msec)
DH1(AFH)	62.4	400
DH3(AFH)	131.5	400
DH5(AFH)	154.4	400

DH1(AFH mode, Modulation type : GFSK)



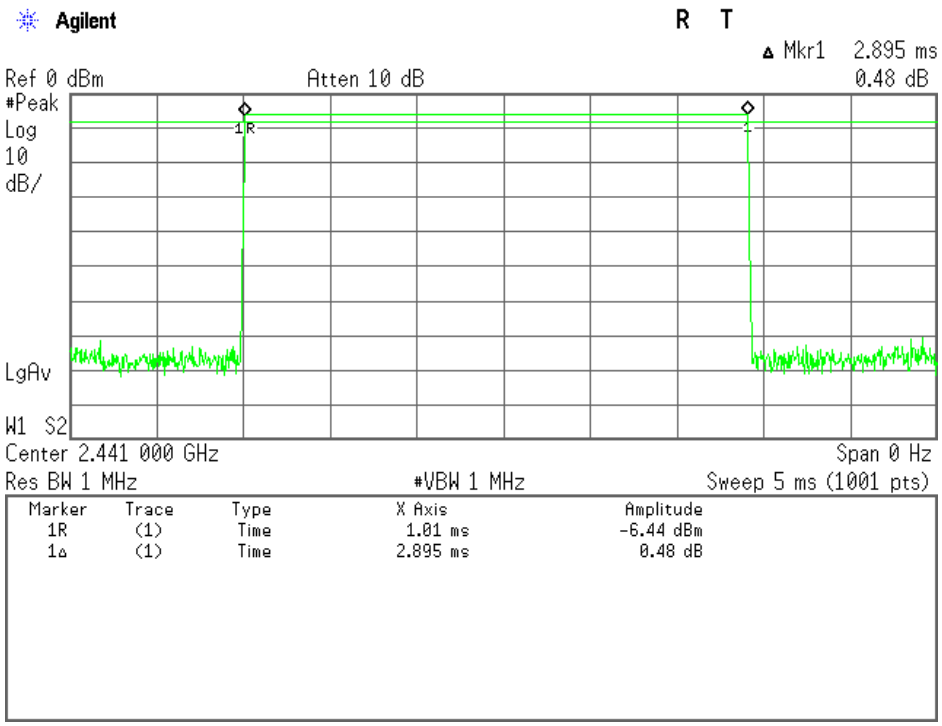
Note : The system makes worst case 800 hops per second (for AFH mode) or 1 time slot has a length of 625 µs with 79 channels. A DH1 Packet need 1 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 400 hops per second with 20 channels. So the system has each channel 20 times per second and so for 8 seconds the system have 160.0 times of appearance.
Each tx-time per appearance is 0.390 ms.
Dwell time = 160.0 * 0.390 = 62.4 ms

DH3(AFH mode, Modulation type : GFSK)



Note : A DH3 Packet need 3 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 200 hops per second with 20 channels. So the system have each channel 10 times per second and so for 8 seconds the system have 80.0 times of appearance.
Each tx-time per appearance is 1.644 ms.
Dwell time = 80.0 * 1.644 = 131.5 ms

DH5(AFH mode, Modulation type : GFSK)



Note : A DH5 Packet need 5 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 133.334 hops per second with 20 channels. So the system have each channel 6.666675 times per second and so for 8 seconds the system have 53.3 times of appearance.
Each tx-time per appearance is 2.895 ms.
Dwell time = 53.3 * 2.895 = 154.4 ms

7.5 Peak Output Power(Conduction)

For the requirements, ☑ - Applicable [☑ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

7.5.1 Test Results

For the standard, ☑ - **Passed** ☐ - **Failed** ☐ - **Not judged**

Peak Output Power of Bluetooth BDR/EDR is 4.49 dBm at 2480.0 MHz
Peak Output Power of Bluetooth LE is 2.73 dBm at 2480.0 MHz

Uncertainty of Measurement Results ± 0.9 dB(2σ)

Remarks : _____

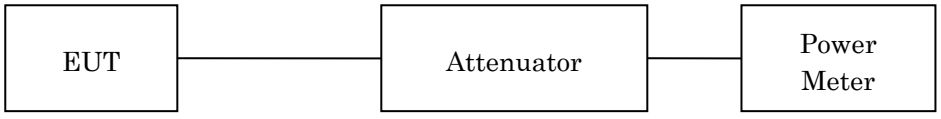
7.5.2 Test Instruments

Shielded Room S4				
Type	**Model**	**Serial No. (ID)**	**Manufacturer**	**Cal. Due**
Power Meter	N1911A	GB45100291 (B-63)	Agilent	2018/07/24
Power Sensor	N1921A	US44510470 (B-64)	Agilent	2018/07/24
Attenuator	54A-10	W5675 (D-28)	Weinschel	2018/08/14
RF Cable	SF102	14253/2 (C-52)	HUBER+SUHNER	2018/08/14

NOTE : The calibration interval of the above test instruments is 12 months.

7.5.3 Test Method and Test Setup (Diagrammatic illustration)

The Conducted RF Power Output was measured with a power meter, one attenuator and a short, low loss cable.



7.5.4 Test Data

1)DH5(Modulation type : GFSK)

Test Date: July 6, 2018
Temp.: 25 °C, Humi: 76 %

Transmitting Frequency		Correction Factor	Meter Reading	Conducted Peak Output Power		Limits	Margin
CH	[MHz]	[dB]	[dBm]	[dBm]	[mW]	[dBm]	[dB]
00	2402	9.90	-6.23	3.67	2.33	20.97	+17.30
39	2441	10.00	-5.90	4.10	2.57	20.97	+16.87
78	2480	10.00	-5.51	4.49	2.81	20.97	+16.48

Calculated result at 2480.000 MHz, as the worst point shown on underline:

	Correction Factor	=	10.00 dB
+)	Meter Reading	=	-5.51 dBm
	Result	=	4.49 dBm = 2.81 mW

Minimum Margin: 20.97 - 4.49 = 16.48 (dB)

NOTES
1. The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
2. Setting of measuring instrument(s) :

Detector Function	Video B.W.
Peak	Off

2) 2DH5(Modulation type : pi/4-DQPSK)

Test Date: July 6, 2018
Temp.: 25 °C, Humi: 76 %

Transmitting Frequency		Correction Factor	Meter Reading	Conducted Peak Output Power		Limits	Margin
CH	[MHz]	[dB]	[dBm]	[dBm]	[mW]	[dBm]	[dB]
00	2402	9.90	- 6.73	3.17	2.07	20.97	+17.80
39	2441	10.00	- 6.21	3.79	2.39	20.97	+17.18
78	2480	10.00	- 5.79	4.21	2.64	20.97	+16.76

Calculated result at 2480.000 MHz, as the worst point shown on underline:

	Correction Factor	=	10.00 dB	
+)	Meter Reading	=	-5.79 dBm	
	Result	=	4.21 dBm	= 2.64 mW

Minimum Margin: 20.97 - 4.21 = 16.76 (dB)

NOTES
1. The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
2. Setting of measuring instrument(s) :

Detector Function	Video B.W.
Peak	Off

3) 3DH5(Modulation type : 8DPSK)

Test Date: July 6, 2018
Temp.: 25 °C, Humi: 76 %

Transmitting Frequency		Correction Factor	Meter Reading	Conducted Peak Output Power		Limits	Margin
CH	[MHz]	[dB]	[dBm]	[dBm]	[mW]	[dBm]	[dB]
00	2402	9.90	- 6.59	3.31	2.14	20.97	+17.66
39	2441	10.00	- 6.14	3.86	2.43	20.97	+17.11
78	2480	10.00	- 5.72	4.28	2.68	20.97	+16.69

Calculated result at 2480.000 MHz, as the worst point shown on underline:

	Correction Factor	=	10.00 dB	
+)	Meter Reading	=	-5.72 dBm	
	Result	=	4.28 dBm	= 2.68 mW

Minimum Margin: 20.97 - 4.28 = 16.69 (dB)

NOTES
1. The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
2. Setting of measuring instrument(s) :

Detector Function	Video B.W.
Peak	Off

4) Bluetooth LE(Modulation type : GFSK)

Test Date: July 6, 2018
Temp.: 25 °C, Humi: 76 %

Transmitting Frequency		Correction Factor	Meter Reading	Conducted Peak Output Power		Limits	Margin
CH	[MHz]	[dB]	[dBm]	[dBm]	[mW]	[dBm]	[dB]
00	2402	9.90	-10.93	-1.03	0.79	30.00	+31.03
19	2440	10.00	- 8.53	1.47	1.40	30.00	+28.53
39	2480	10.00	- 7.27	2.73	1.87	30.00	+27.27

Calculated result at 2480.000 MHz, as the worst point shown on underline:

	Correction Factor	=	10.00 dB	
+)	Meter Reading	=	-7.27 dBm	
	Result	=	2.73 dBm	= 1.87 mW

Minimum Margin: 30.00 - 2.73 = 27.27 (dB)

NOTES
1. The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
2. Setting of measuring instrument(s) :

Detector Function	Video B.W.
Peak	Off

7.6 Peak Power Density(Conduction)

For the requirements, ☐ - Applicable [☐ - Tested. ☐ - Not tested by applicant request.]
☑ - Not Applicable

7.6.1 Test Results

For the standard, ☑ - **Passed** ☐ - **Failed** ☐ - **Not judged**

Peak Power Density of Bluetooth LE is 1.41 dBm at 2480.0 MHz

Uncertainty of Measurement Results ± 1.7 dB(2σ)

Remarks : _____

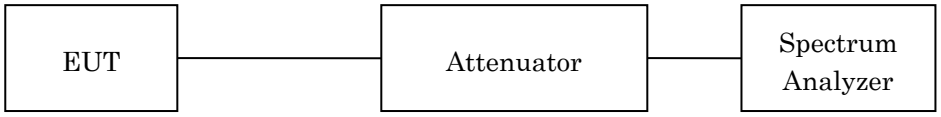
7.6.2 Test Instruments

Shielded Room S4				
Type	**Model**	**Serial No. (ID)**	**Manufacturer**	**Cal. Due**
Spectrum Analyzer	E4446A	US44300388 (A-39)	Agilent	2019/03/27
Attenuator	54A-10	W5675 (D-28)	Weinschel	2018/08/14
RF Cable	SF102	14253/2 (C-52)	HUBER+SUHNER	2018/08/14

NOTE : The calibration interval of the above test instruments is 12 months.

7.6.3 Test Method and Test Setup (Diagrammatic illustration)

The test system is shown as follows:



7.6.4 Test Data

Bluetooth LE(Modulation type : GFSK)

Test Date: July 6, 2018
Temp.: 25 °C, Humi: 76 %

Transmitting Frequency		Correction Factor	Meter Reading	Conducted Peak Power Density		Limits	Margin
CH	[MHz]	[dB]	[dBm]	[dBm]	[mW]	[dBm]	[dB]
00	2402	9.90	-12.62	-2.72	0.53	8.00	+10.72
19	2440	10.00	-10.11	-0.11	0.98	8.00	+ 8.11
39	2480	10.00	-8.59	1.41	1.38	8.00	+ 6.59

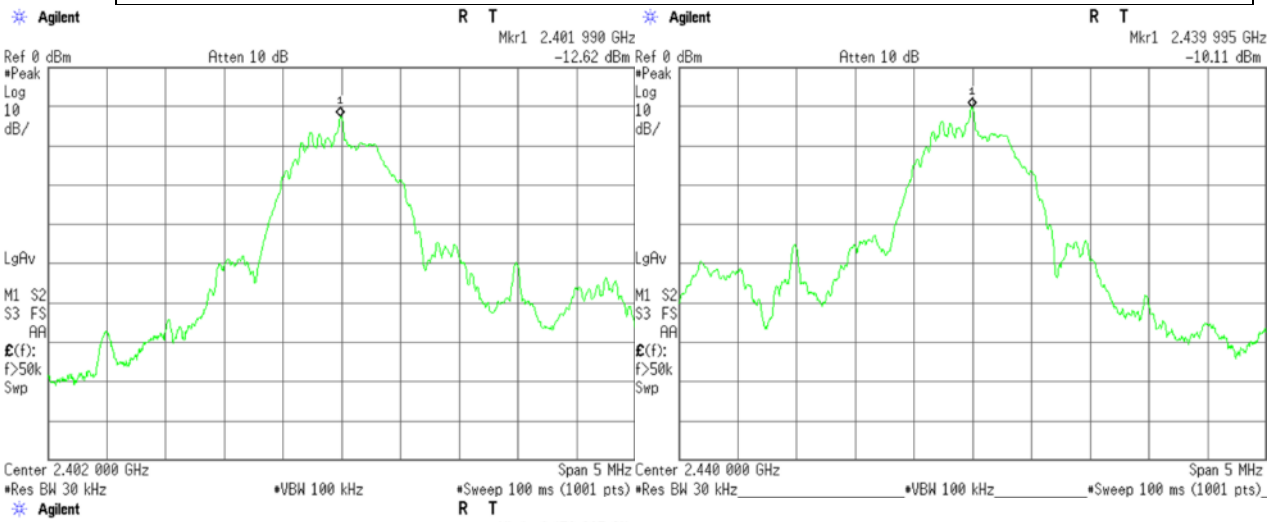
Calculated result at 2480.000 MHz, as the worst point shown on underline:

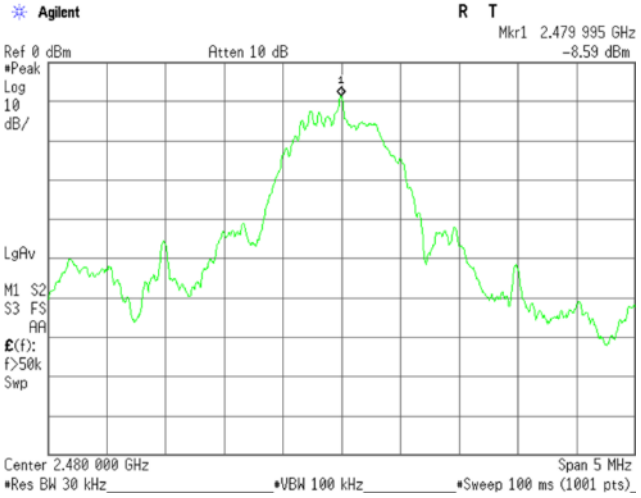
	Correction Factor	=	10.00 dB
+)	Meter Reading	=	-8.59 dBm
	Result	=	1.41 dBm = 1.38 mW

Minimum Margin: 8.00 - 1.41 = 6.59 (dB)

NOTES
1. The peak power density complied with the limit using 30 kHz resolution bandwidth of Spectrum Analyzer.
2. The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
3. Setting of measuring instrument(s) :

Detector Function	RES B.W.	Video B.W.
Peak	30kHz	100kHz





7.7 Spurious Emissions(Conduction)

For the requirements, ☑ - Applicable [☑ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

7.7.1 Test Results

For the standard, ☑ - **Passed** ☐ - **Failed** ☐ - **Not judged**

Uncertainty of Measurement Results		
9 kHz – 1 GHz	± 1.4	dB(2σ)
1 GHz – 18 GHz	± 1.7	dB(2σ)
18 GHz – 40 GHz	± 2.3	dB(2σ)

Remarks :

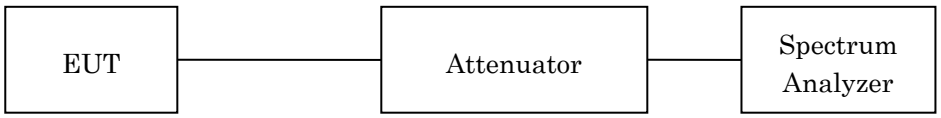
7.7.2 Test Instruments

Shielded Room S4				
Type	**Model**	**Serial No. (ID)**	**Manufacturer**	**Cal. Due**
Spectrum Analyzer	E4446A	US44300388 (A-39)	Agilent	2019/03/27
Attenuator	54A-10	W5675 (D-28)	Weinschel	2018/08/14
RF Cable	SF102	14253/2 (C-52)	HUBER+SUHNER	2018/08/14

NOTE : The calibration interval of the above test instruments is 12 months.

7.7.3 Test Method and Test Setup (Diagrammatic illustration)

The test system is shown as follows:



The setting of the spectrum analyzer are shown as follows:

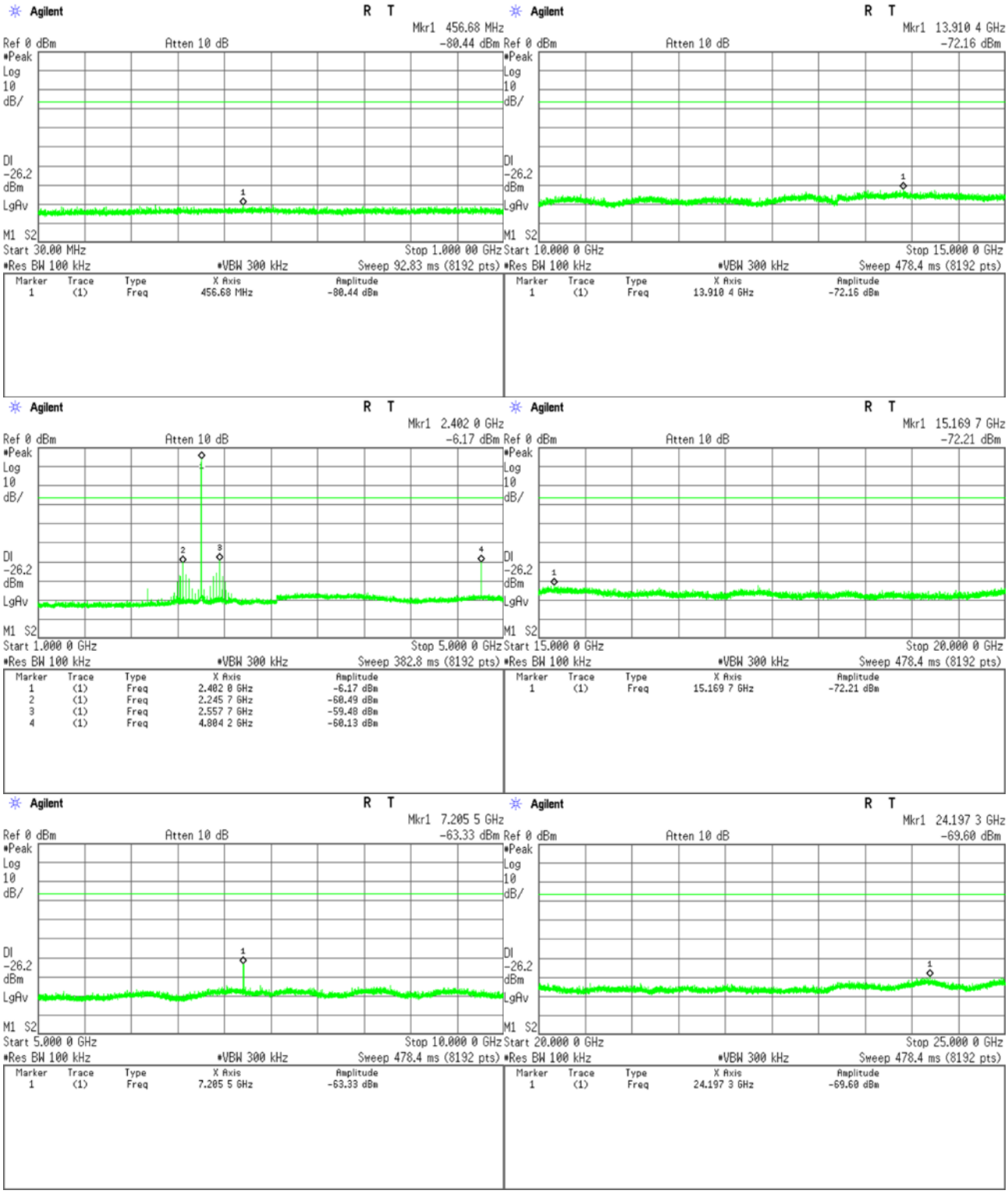
Frequency Range	30 MHz - 25 GHz	Band-Edge
Res. Bandwidth	100 kHz	100 kHz
Video Bandwidth	300 kHz	300 kHz
Sweep Time	AUTO	AUTO
Trace	Maxhold	Maxhold

7.7.4 Test Data

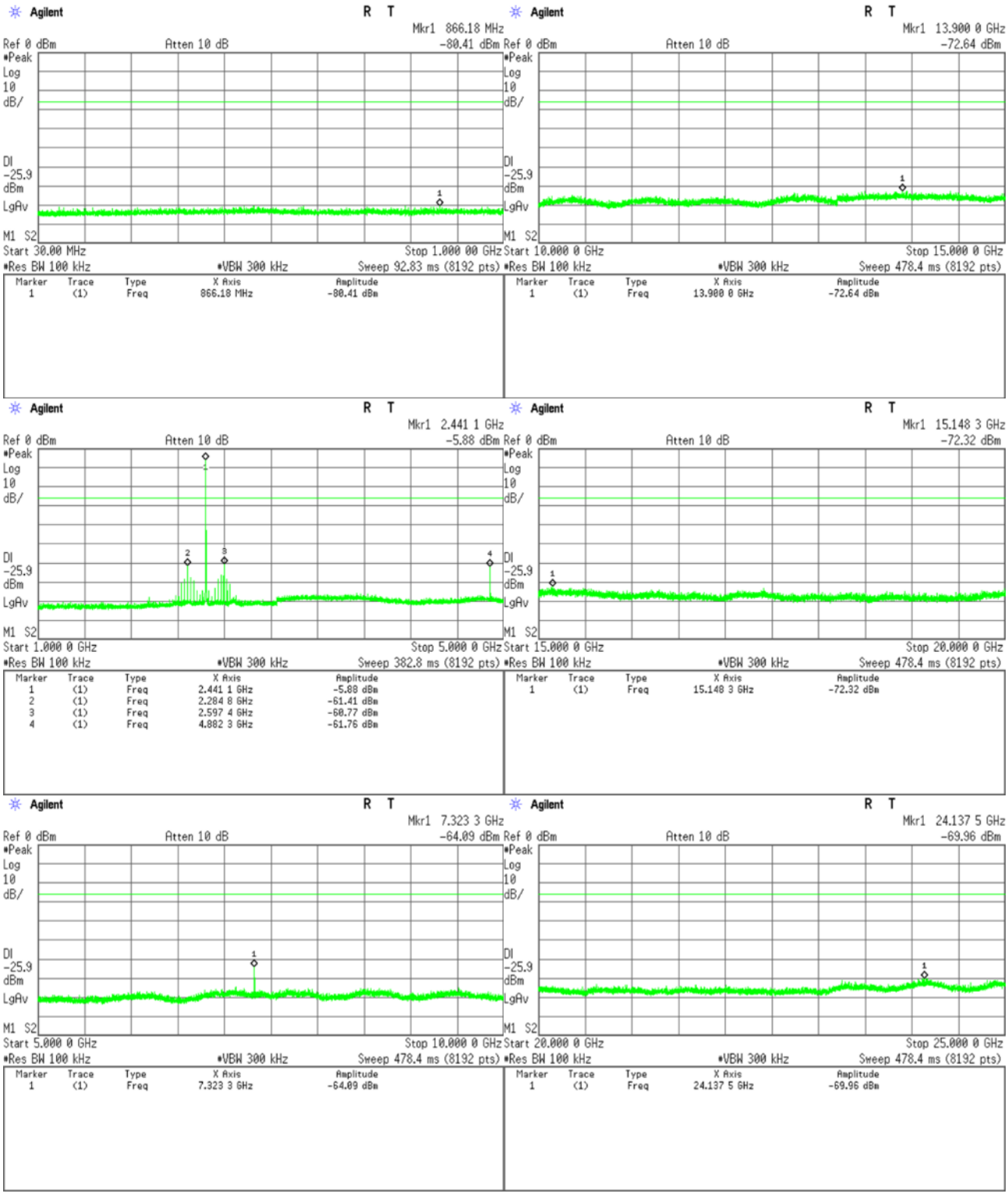
Test Date :July 6, 2018
Temp.:25°C, Humi.:76%, Atm.:992hPa

1) Mode of EUT : BDR (worst case)

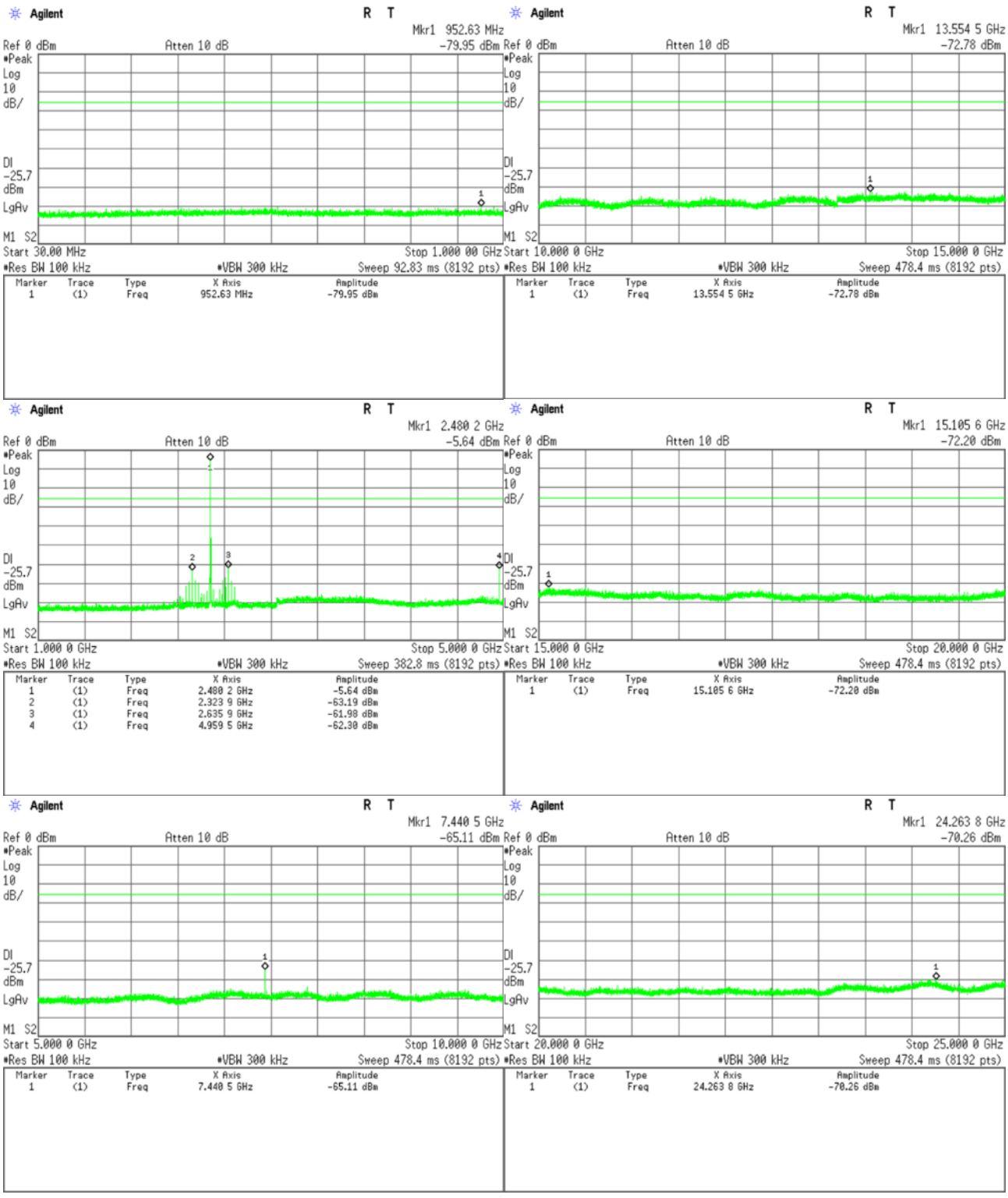
Low Channel



Middle Channel

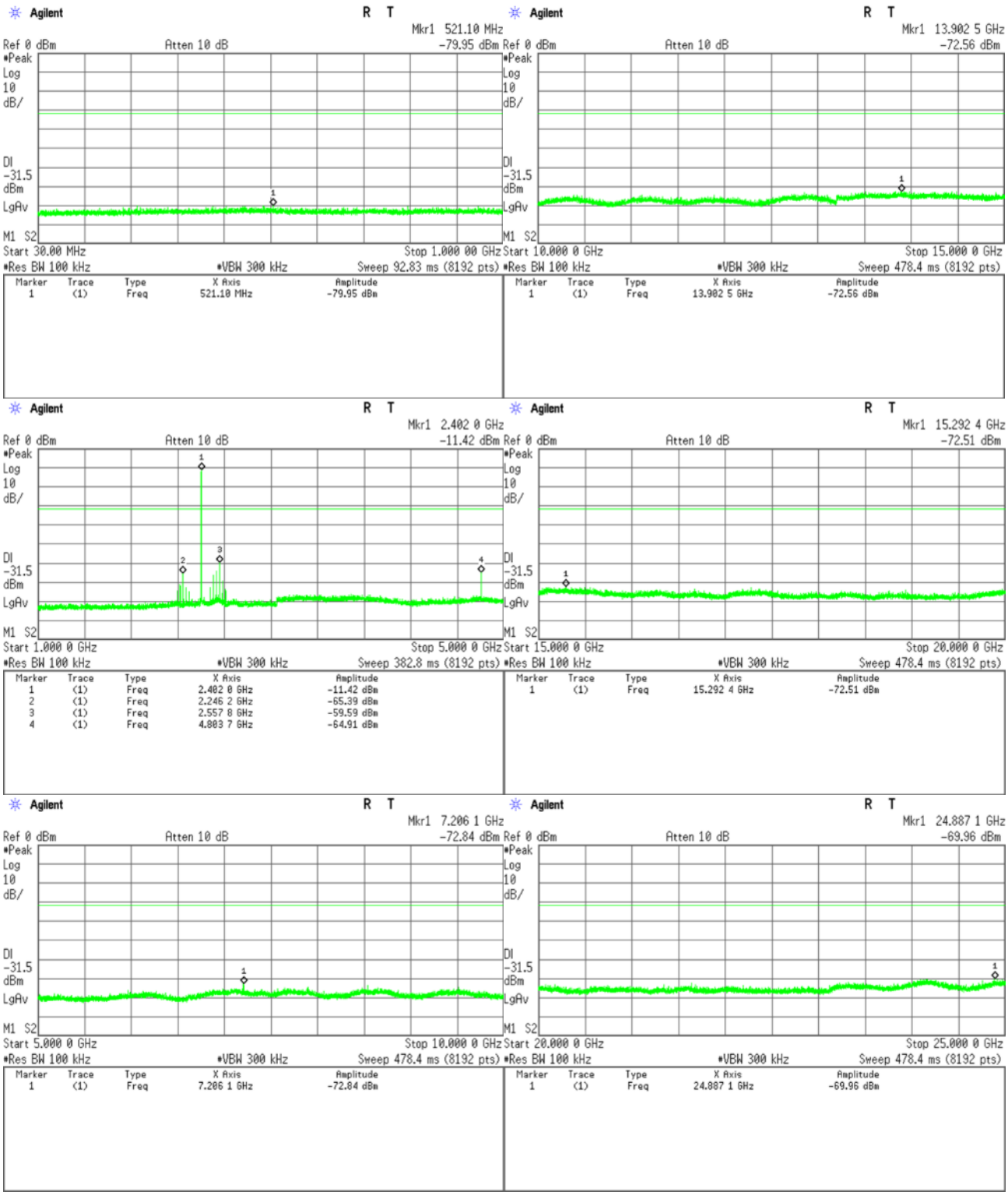


High Channel

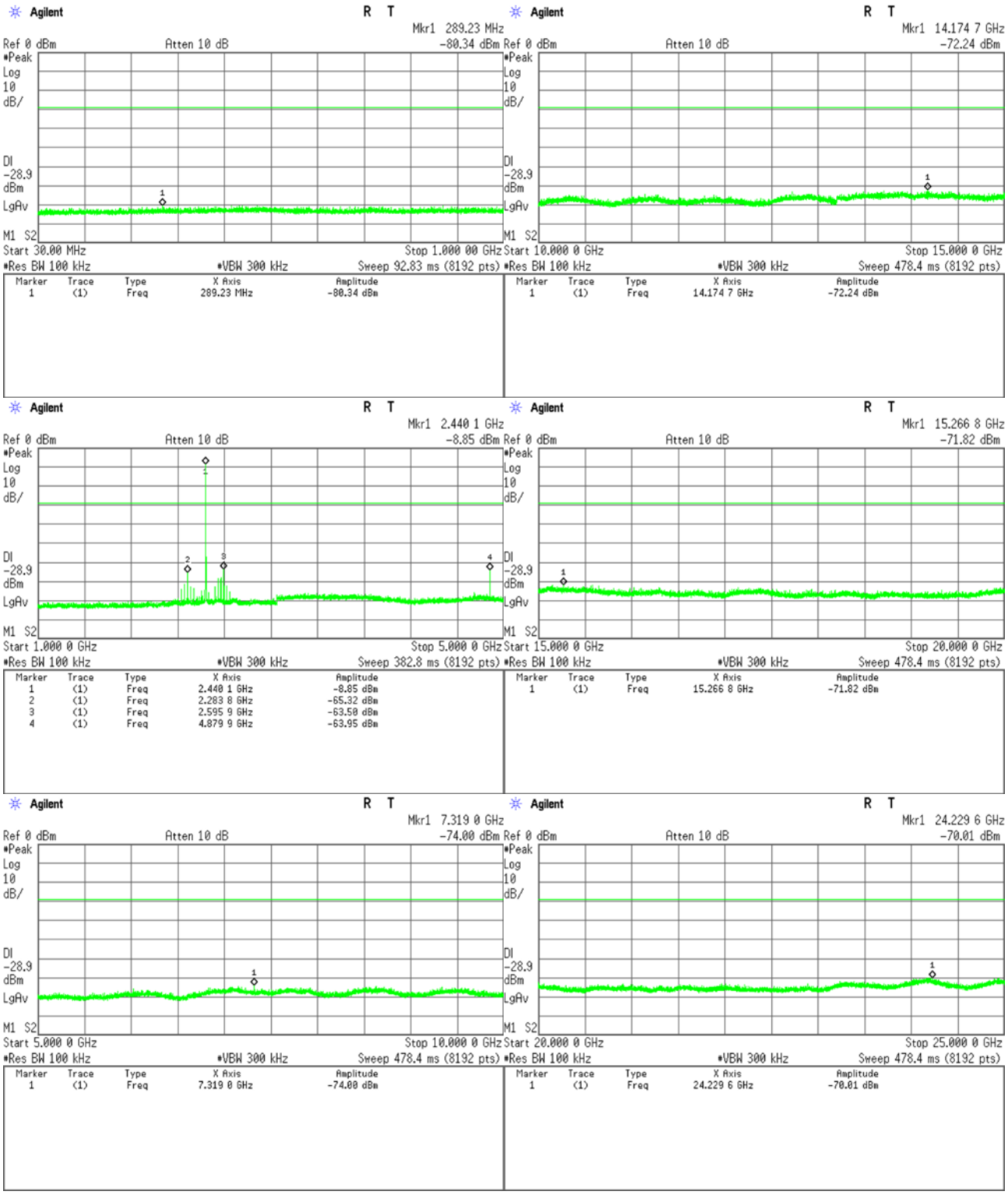


2) Mode of EUT : LE

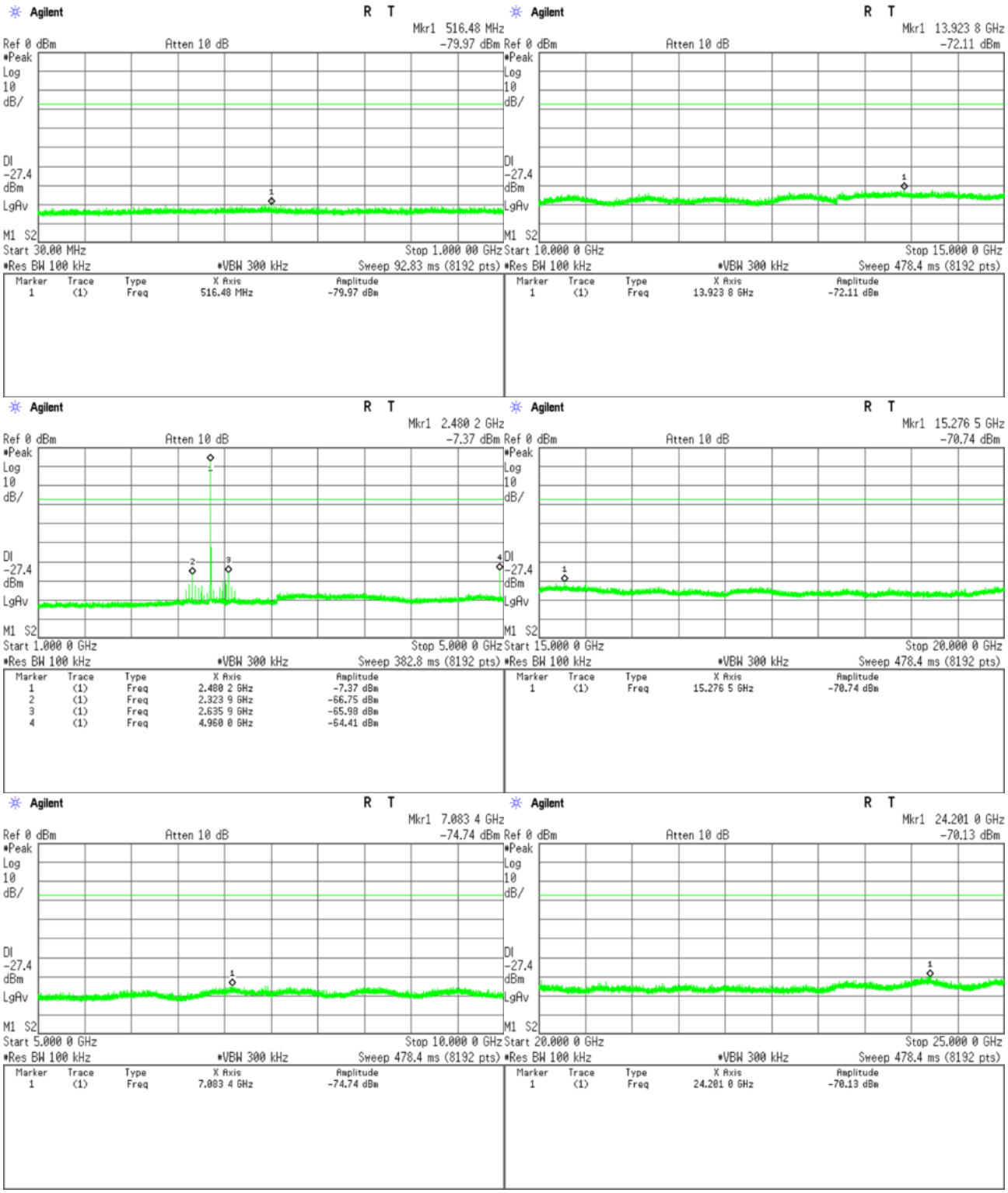
Low Channel



Middle Channel



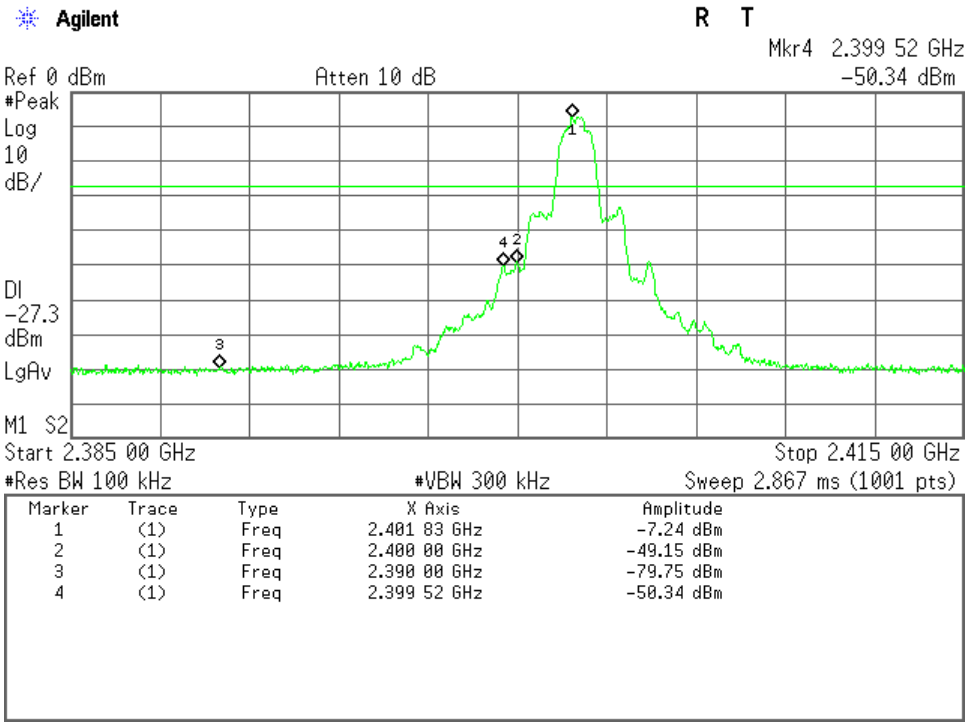
High Channel



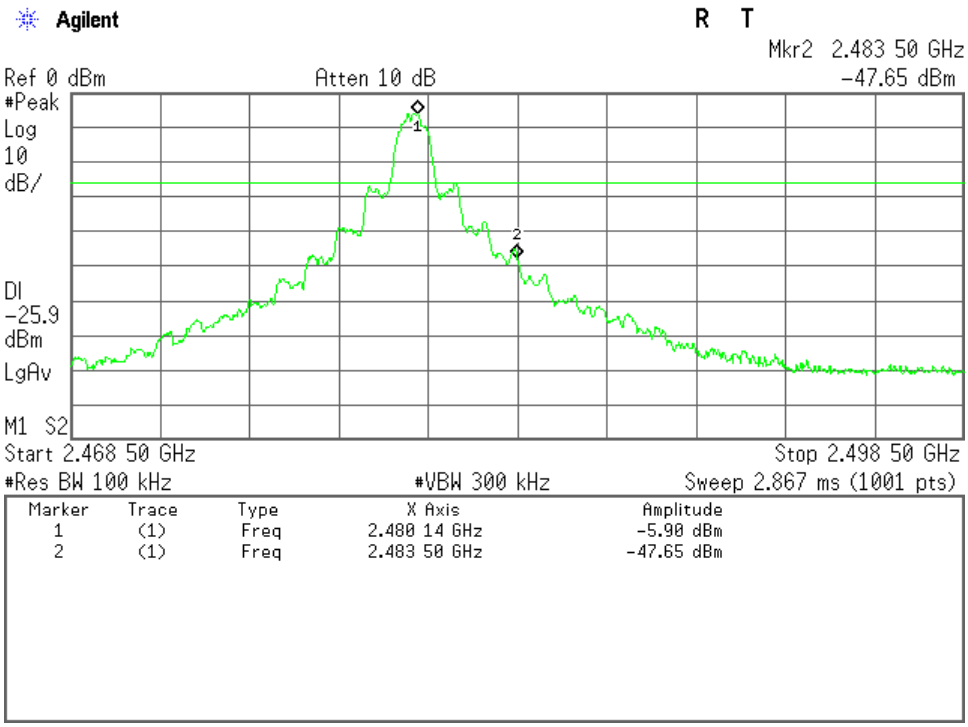
Band-Edge Emission

1) Mode of EUT : EDR (worst case)

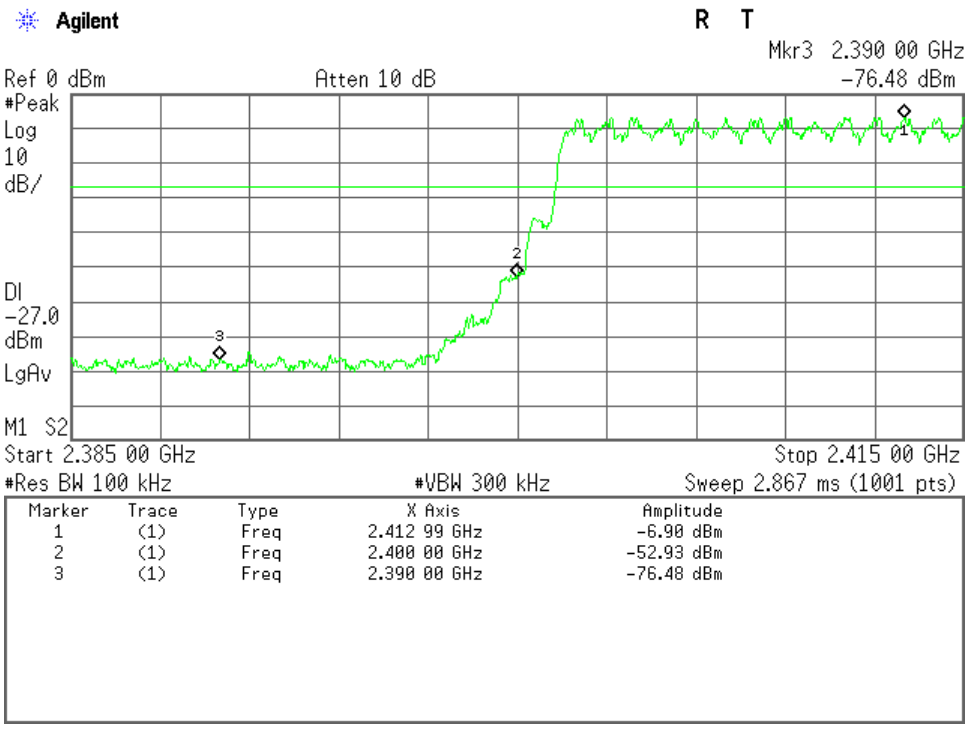
Low Channel(Hopping off), Band-Edge Emission



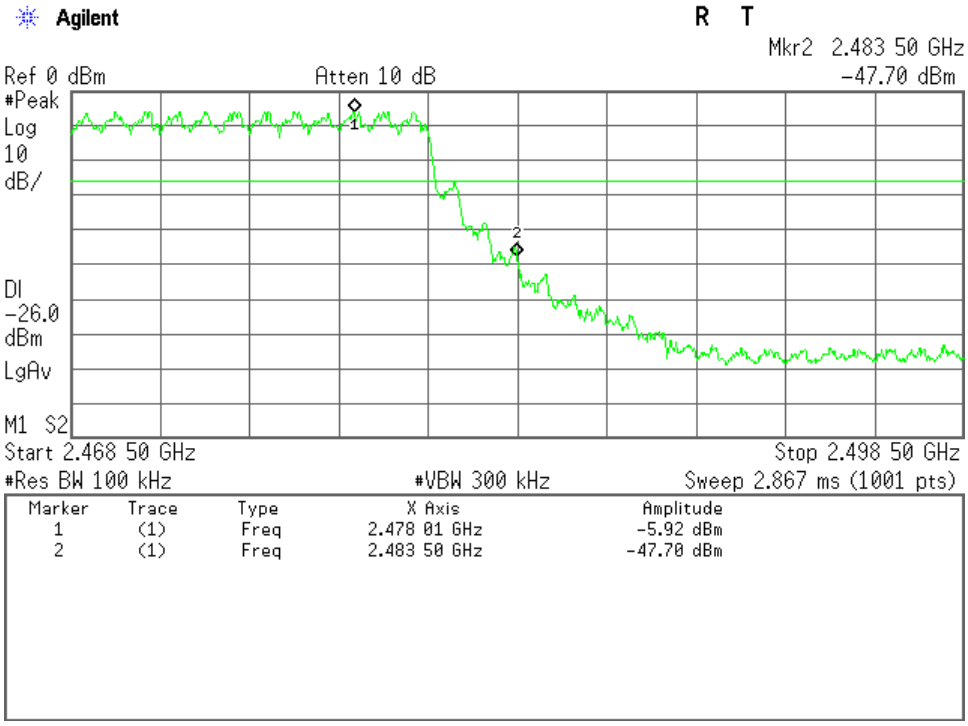
High Channel(Hopping off), Band-Edge Emission



Low Channel(Hopping on), Band-Edge Emission

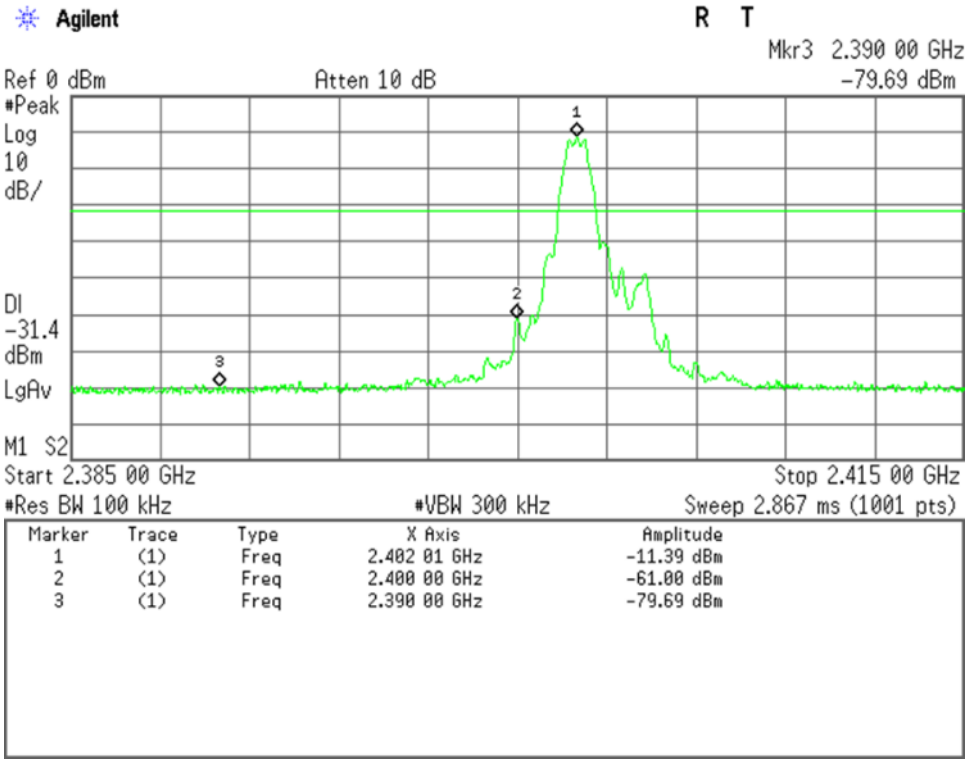


High Channel(Hopping on), Band-Edge Emission

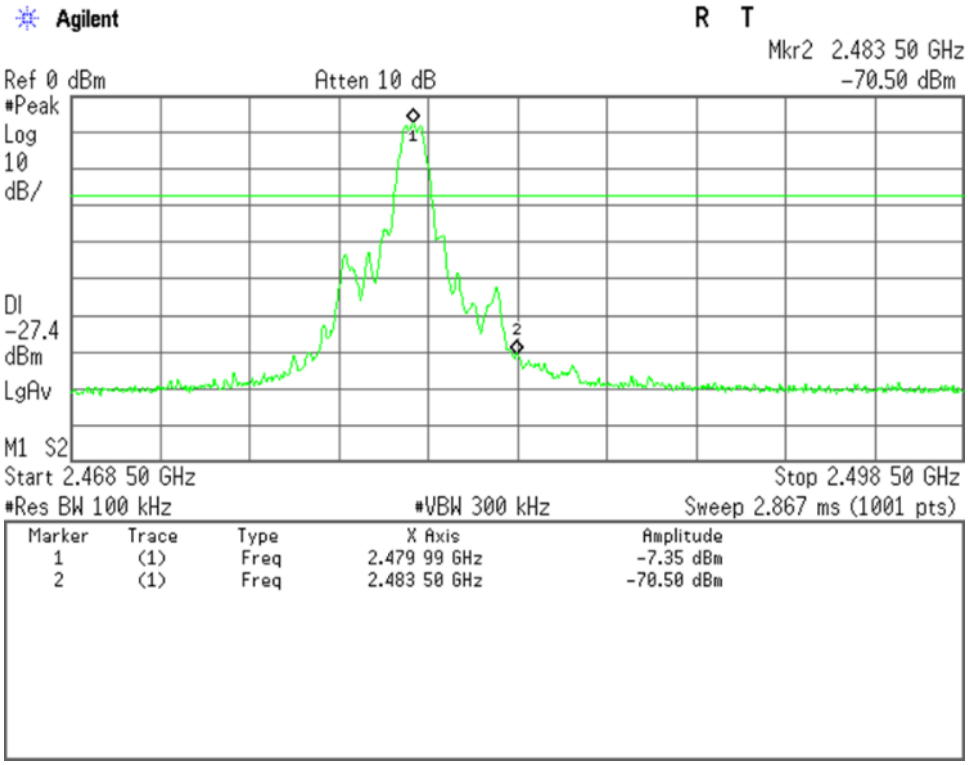


2) Mode of EUT : LE

Low Channel



High Channel



7.8 AC Powerline Conducted Emission

For the requirements, ☑ - Applicable [☑ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

7.8.1 Test Results

For the standard, ☑ - **Passed** ☐ - **Failed** ☐ - **Not judged**

Min. Limit Margin (Quasi-Peak) 24.4 dB at 0.157/0.1588 MHz

Uncertainty of Measurement Results ± 2.6 dB(2σ)

Remarks : _____

7.8.2 Test Instruments

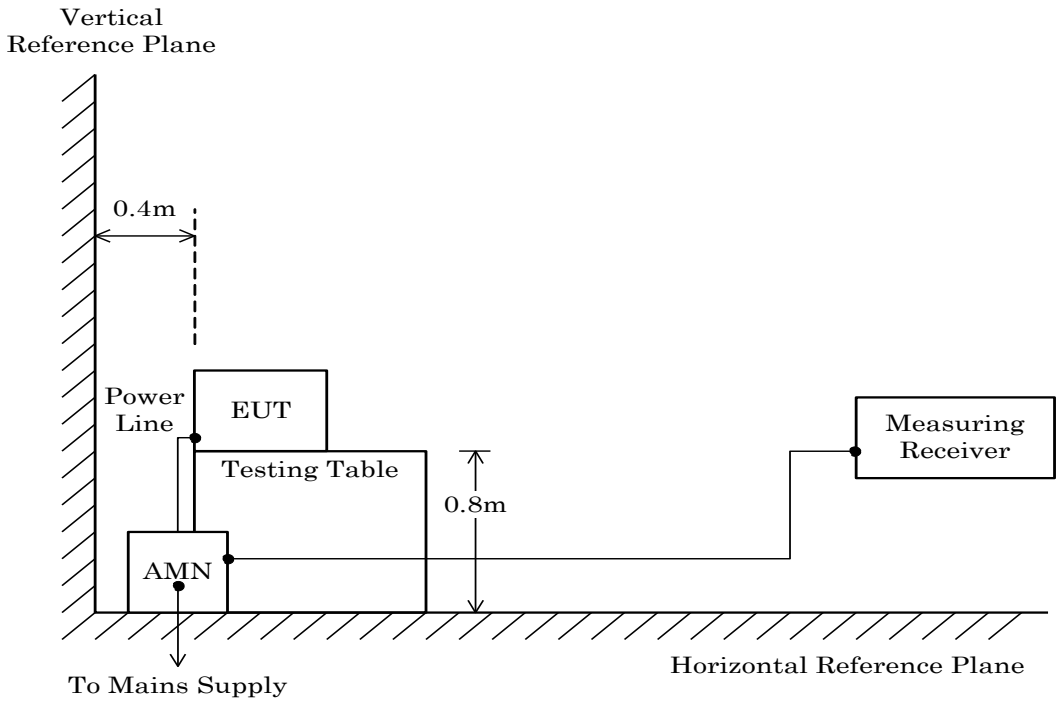
Measurement Room M2				
Type	**Model**	**Serial No. (ID)**	**Manufacturer**	**Cal. Due**
Test Receiver	ESU 26	100170 (A-6)	Rohde & Schwarz	2018/11/09
AMN (main)	KNW-407R	8-1832-1 (D-39)	Kyoritsu	2018/09/28
RF Cable	RG223/U	--- (H-34)	HUBER+SUHNER	2019/06/06

NOTE : The calibration interval of the above test instruments is 12 months.

7.8.3 Test Method and Test Setup (Diagrammatic illustration)

The preliminary tests were performed using the scan mode of test receiver or spectrum analyzer to observe the emissions characteristics of the EUT.
The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions.
This configurations was used for final tests.

– Side View –



NOTE
AMN : Artificial Mains Network

7.8.4 Test Data

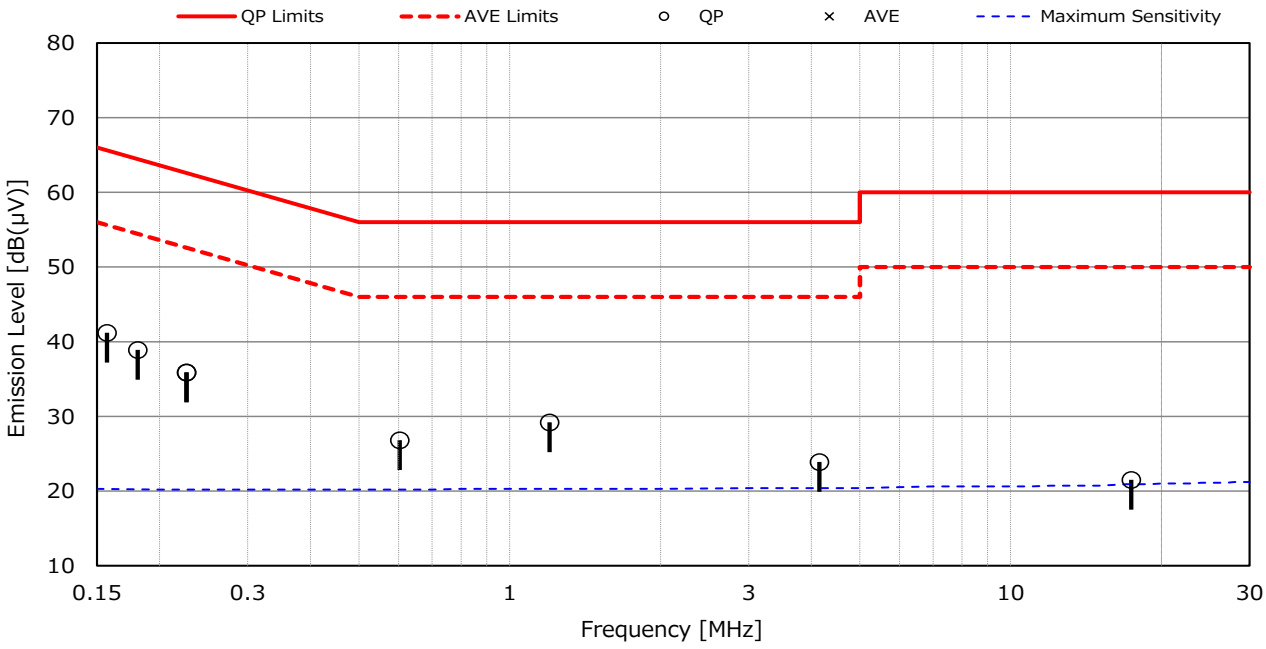
Mode of EUT : All modes have been investigated and the worst case mode for channel (39ch: 2441MHz) has been listed.

Test voltage : 120VAC 60Hz

Test Date: July 27, 2018
Temp.: 24 °C, RH: 70 %, Atm.: 991 hPa

Measured phase : L1

Frequency [MHz]	Factor [dB]	Readings [dB(μV)] QP	Readings [dB(μV)] AVE	Limits [dB(μV)] QP	Limits [dB(μV)] AVE	Results [dB(μV)] QP	Results [dB(μV)] AVE	Margin [dB] QP	Margin [dB] AVE	Remarks
0.1570	10.3	30.9	--	65.6	55.6	41.2	--	+ 24.4	--	-
0.1809	10.3	28.6	--	64.4	54.4	38.9	--	+ 25.5	--	-
0.2262	10.2	25.7	--	62.6	52.6	35.9	--	+ 26.7	--	-
0.6030	10.2	16.6	--	56.0	46.0	26.8	--	+ 29.2	--	-
1.2004	10.3	18.9	--	56.0	46.0	29.2	--	+ 26.8	--	-
4.1509	10.4	13.5	--	56.0	46.0	23.9	--	+ 32.1	--	-
17.4168	10.9	10.6	--	60.0	50.0	21.5	--	+ 38.5	--	-



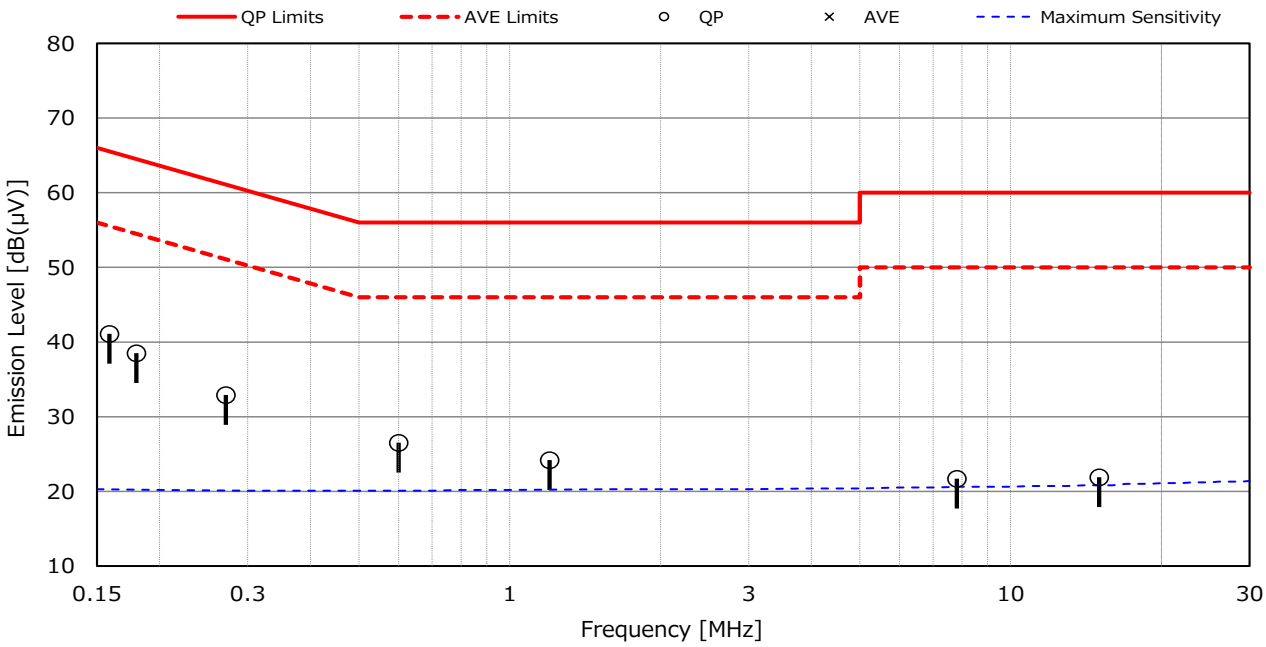
NOTES
1) The spectrum was checked from 150 kHz to 30 MHz.
2) The factor includes the AMN voltage division factor and the cable loss.
3) The symbol of "--" means "not applicable".
4) Calculated result as the worst point shown on underline :
Factor + Reading (QP) = 10.3 + 30.9 = 41.2 dB(μV) at 0.1570 MHz
5) QP : Quasi-Peak detector, AVE : Average detector
6) Bandwidth : 9 kHz (150 kHz - 30 MHz)

Test voltage : 120VAC 60Hz

Test Date: July 27, 2018
Temp.: 24 °C, RH: 70 %, Atm.: 991 hPa

Measured phase : L2

Frequency	Factor	Readings [dB(μV)]		Limits [dB(μV)]		Results [dB(μV)]		Margin [dB]		Remarks
[MHz]	[dB]	QP	AVE	QP	AVE	QP	AVE	QP	AVE	
0.1588	10.3	30.8	--	65.5	55.5	41.1	--	+ 24.4	--	-
0.1797	10.3	28.2	--	64.5	54.5	38.5	--	+ 26.0	--	-
0.2711	10.1	22.8	--	61.1	51.1	32.9	--	+ 28.2	--	-
0.6000	10.1	16.4	--	56.0	46.0	26.5	--	+ 29.5	--	-
1.2016	10.3	13.9	--	56.0	46.0	24.2	--	+ 31.8	--	-
7.8099	10.6	11.1	--	60.0	50.0	21.7	--	+ 38.3	--	-
15.0203	10.8	11.1	--	60.0	50.0	21.9	--	+ 38.1	--	-



NOTES
1) The spectrum was checked from 150 kHz to 30 MHz.
2) The factor includes the AMN voltage division factor and the cable loss.
3) The symbol of "--" means "not applicable".
4) Calculated result as the worst point shown on underline :
Factor + Reading (QP) = 10.3 + 30.8 = 41.1 dB(μV) at 0.1588 MHz
5) QP : Quasi-Peak detector, AVE : Average detector
6) Bandwidth : 9 kHz (150 kHz - 30 MHz)

7.9 Radiated Emission

For the requirements, ☑ - Applicable [☑ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

7.9.1 Test Results

For the standard, ☑ - **Passed** ☐ - **Failed** ☐ - **Not judged**

Min. Limit Margin (Average) 0.8 dB at 4880.0 MHz

Uncertainty of Measurement Results

9 kHz – 30 MHz	± 3.0	dB(2σ)
30 MHz – 200 MHz	± 3.6	dB(2σ)
200 MHz – 1000 MHz	± 5.2	dB(2σ)
1 GHz – 6 GHz	± 4.7	dB(2σ)
6 GHz – 18 GHz	± 4.6	dB(2σ)
18 GHz – 40 GHz	± 5.5	dB(2σ)

Remarks : LE mode. The measurement result is within the range of measurement uncertainty.

7.9.2 Test Instruments

Anechoic Chamber A2				
Type	**Model**	**Serial No. (ID)**	**Manufacturer**	**Cal. Due**
Test Receiver	ESU 26	100170 (A-6)	Rohde & Schwarz	2018/11/09
Loop Antenna	HFH2-Z2	860605/030 (C-3)	Rohde & Schwarz	2018/08/01
RF Cable	RG213/U	--- (H-29)	HUBER+SUHNER	2018/08/01
Pre-Amplifier	310N	304573 (A-17)	SONOMA	2019/04/01
Biconical Antenna	VHA9103/BBA9106	2355 (C-30)	Schwarzbeck	2019/05/30
Log-periodic Antenna	VULP9118B	870 (C-25)	Schwarzbeck	2018/11/28
RF Cable	S 10162 B-11 etc.	--- (H-4)	HUBER+SUHNER	2019/04/01
Pre-Amplifier	TPA0118-36	1010 (A-37)	TOYO	2019/05/20
Double-Ridge Guide Horn Antenna	TR17206	73370006 (C-29)	ADVANTEST	2019/06/14
Horn Antenna	3160-09	9808-1117 (C-48)	EMCO	2019/06/24
Pre-Amplifier	RP1826G-45H	RP140121-11 (A-53)	EMCS	2019/06/24
RF Cable	SF102E	10055/2E (C-75)	HUBER+SUHNER	2019/01/11
RF Cable	SF102E	6683/2E (C-70)	HUBER+SUHNER	2018/12/03
RF Cable	SF102EA	3041/2EA (C-69)	HUBER+SUHNER	2019/01/10
Band Rejection Filter	BRM50701	029 (D-93)	MICRO-TRONICS	2019/02/06
Attenuator	54A-10	W5713 (D-29)	Weinschel	2018/08/14

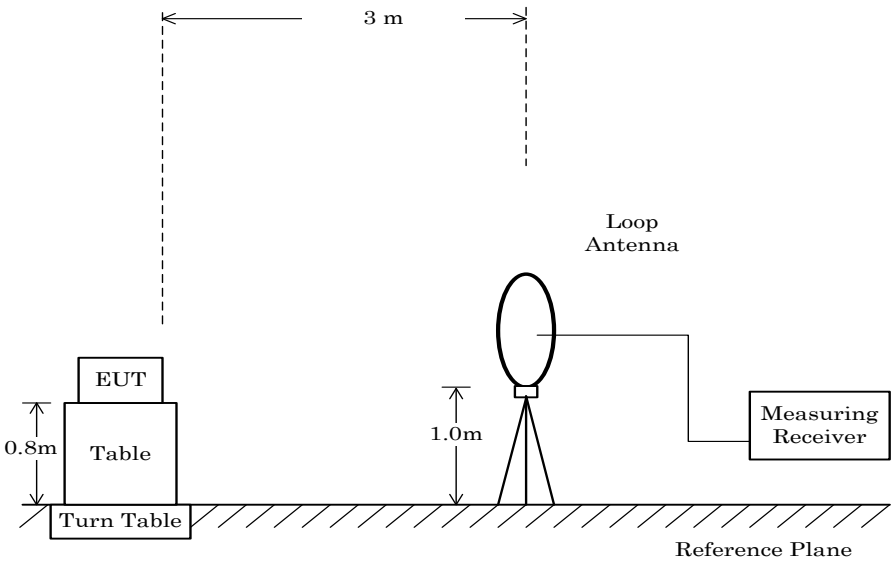
NOTE : The calibration interval of the above test instruments is 12 months.

7.9.3 Test Method and Test Setup (Diagrammatic illustration)

7.9.3.1 Radiated Emission 9 kHz – 30 MHz

The preliminary tests were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.
The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions.
The measurement were performed about three antenna orientations (parallel, perpendicular, and ground-parallel).
According to KDB 414788, a used anechoic chamber were equivalent to those on an open fields site based on comparison measurements.
This configurations was used for the final tests.

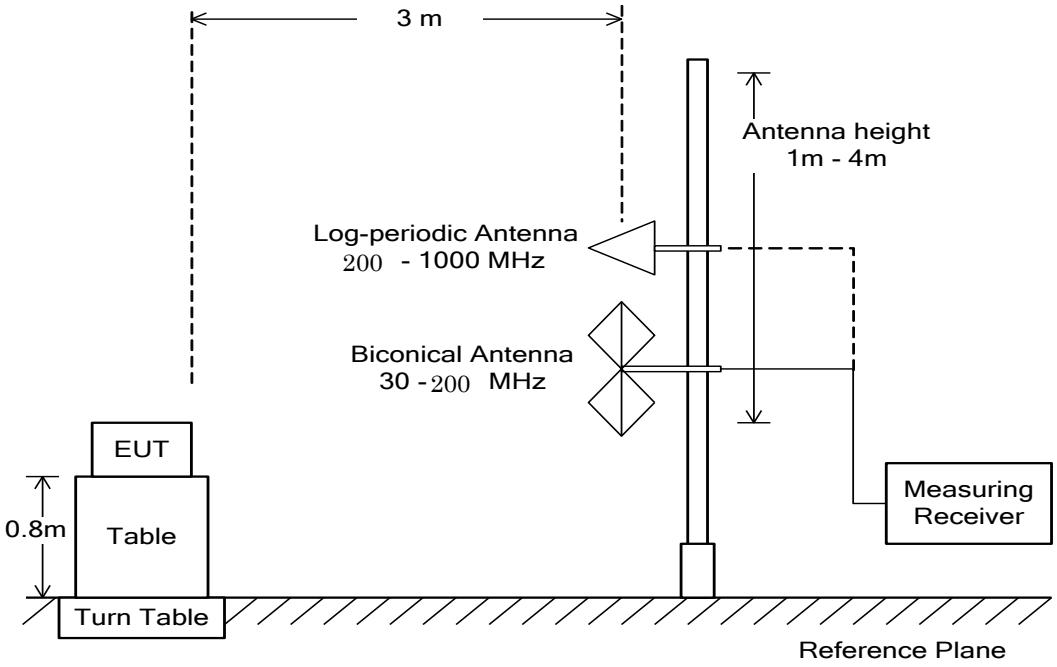
– Side View –



7.9.3.2 Radiated Emission 30 MHz – 1000 MHz

The preliminary tests were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.
The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions.
This configurations was used for the final tests.

– Side View –



7.9.3.3 Radiated Emission above 1 GHz

The preliminary tests were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.
The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions.
This configurations was used for the final tests.

The setting of the measuring instruments are shown as follows:

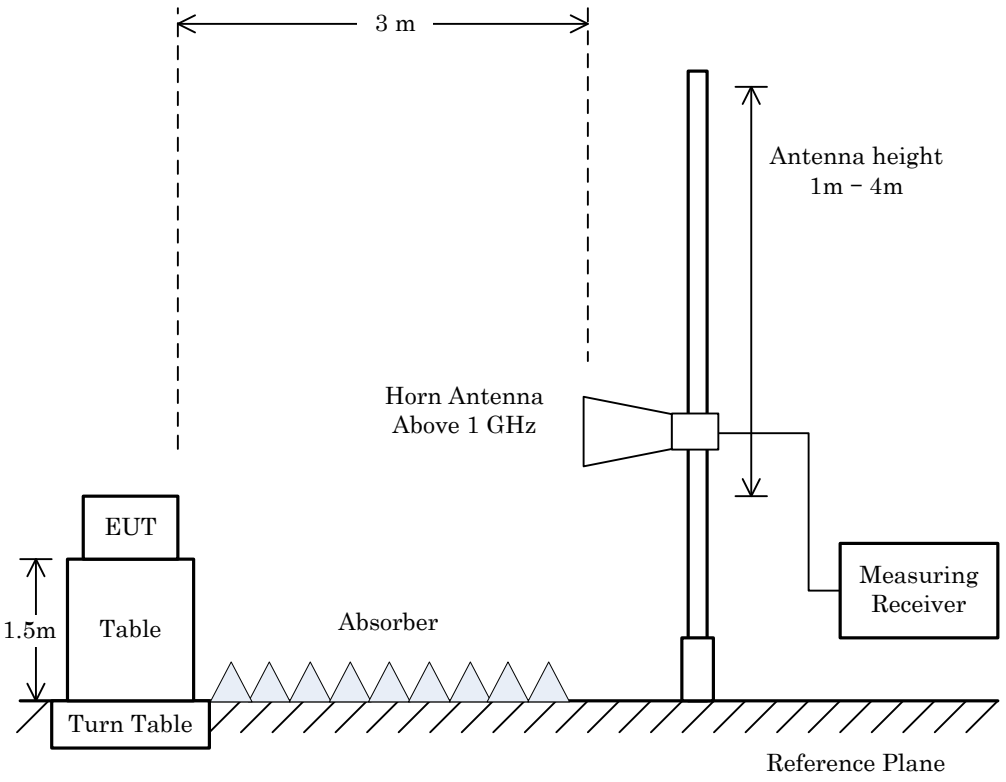
Type	Peak	Average
Detector Function	Peak	Peak
Res. Bandwidth	1 MHz	1 MHz
Video Bandwidth	3 MHz	≥ 1/T *1)
Video Filtering	Linear Voltage	Linear Voltage
Sweep Time	AUTO	AUTO
Trace	Max Hold	Max Hold

Note: 1. T: Minimum transmission duration

Average (VBW) Setting:

Mode	Interval (msec)	Cycle (msec)	Duty cycle (%)	Burst on period(T) (msec)	Min. VBW(1/T) (kHz)	VBW Setting (kHz)
BDR(DH5)	0.86	3.75	77.1%	2.89	0.35	0.50
LE	0.23	0.62	62.9%	0.39	2.56	3.00

– Side View –



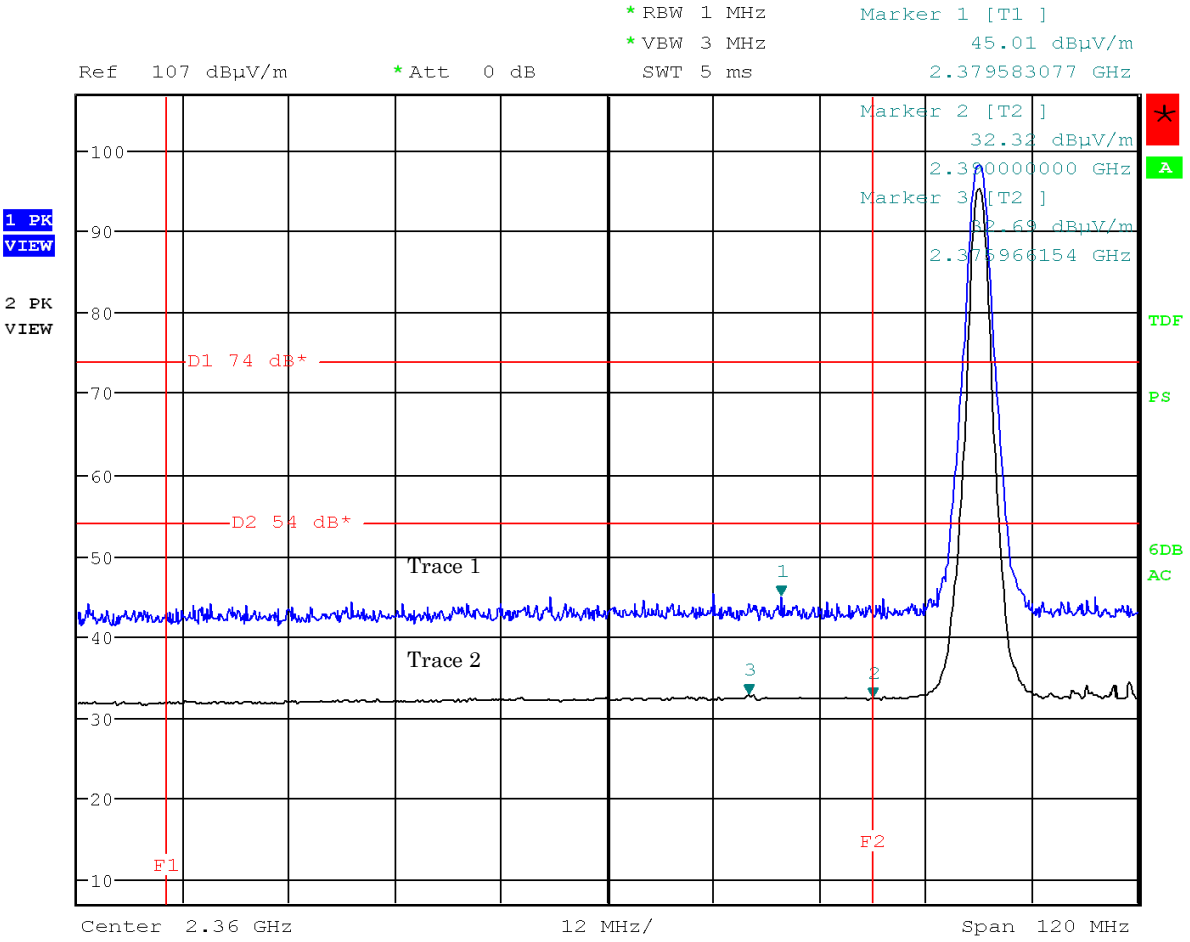
NOTE
When the EUT is manipulated through three different orientations, the scan height upper range for the measurement antenna is limited to 2.5 m or 0.5 m above the top of the EUT.

7.9.4 Test Data

7.9.4.1 Band-edge Compliance

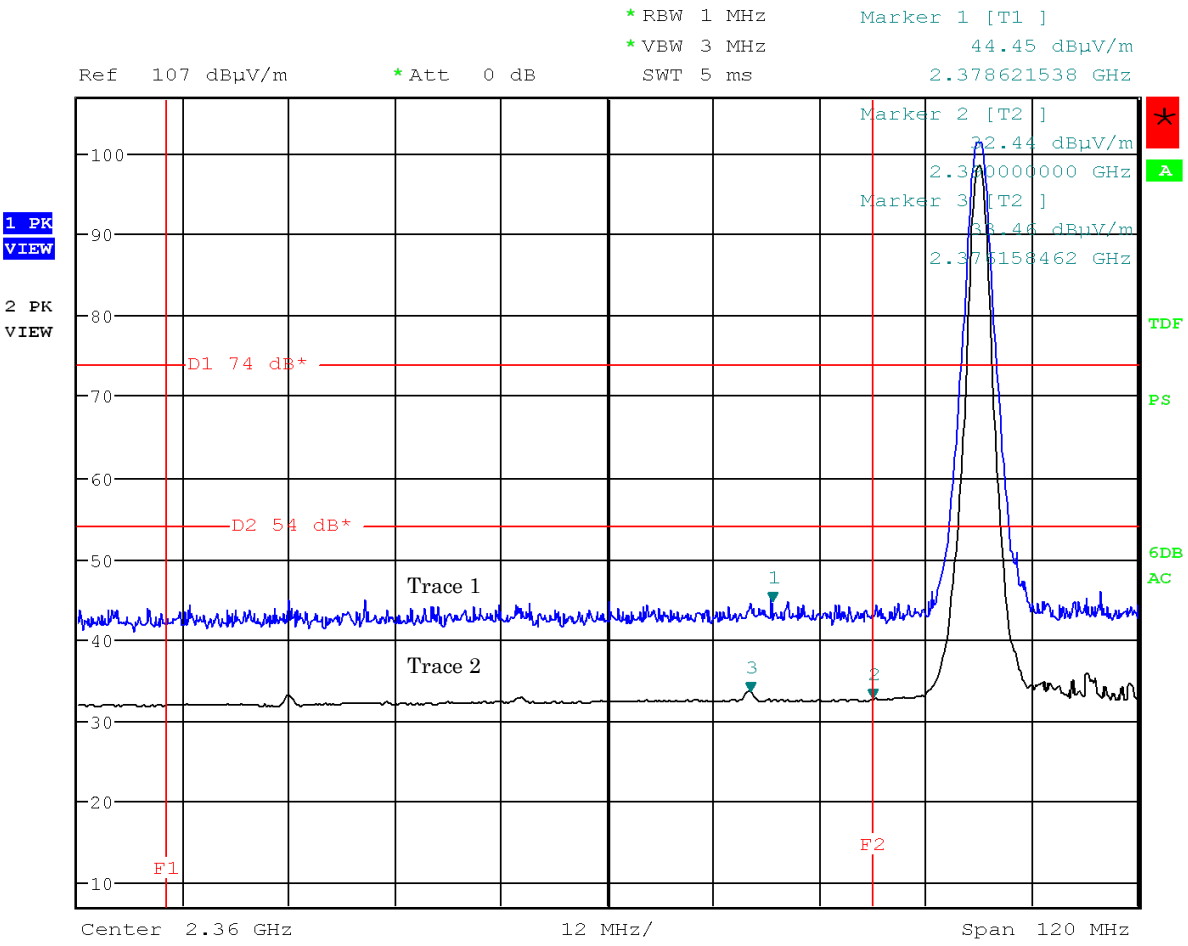
Test Date :July 17, 2018
Temp.:24°C, Humi.:75%, Atm.:996hPa

Mode of EUT : EDR, Hopping off (0ch: 2402 MHz) (worst case)
Antenna Polarization : Horizontal



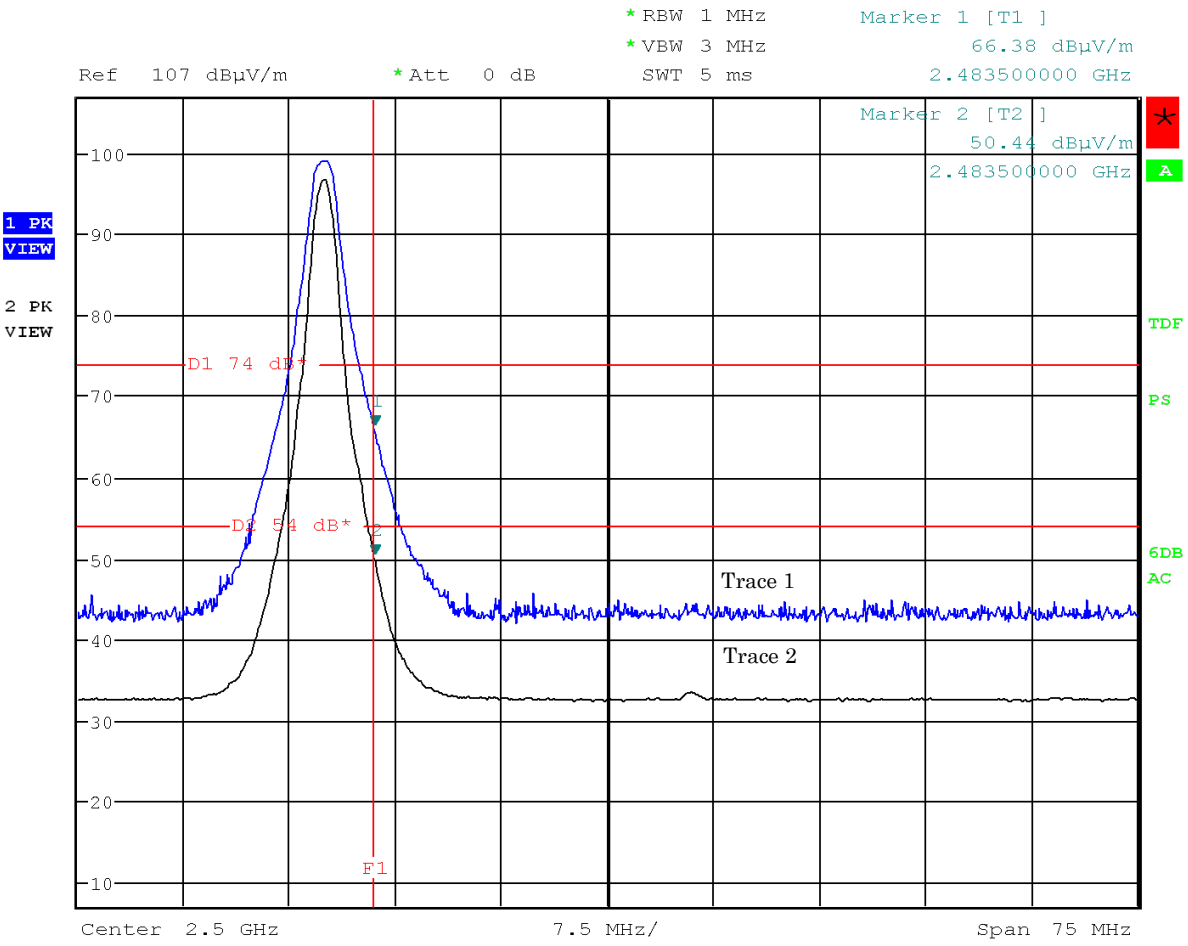
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : EDR, Hopping off (0ch: 2402 MHz) (worst case)
Antenna Polarization : Vertical



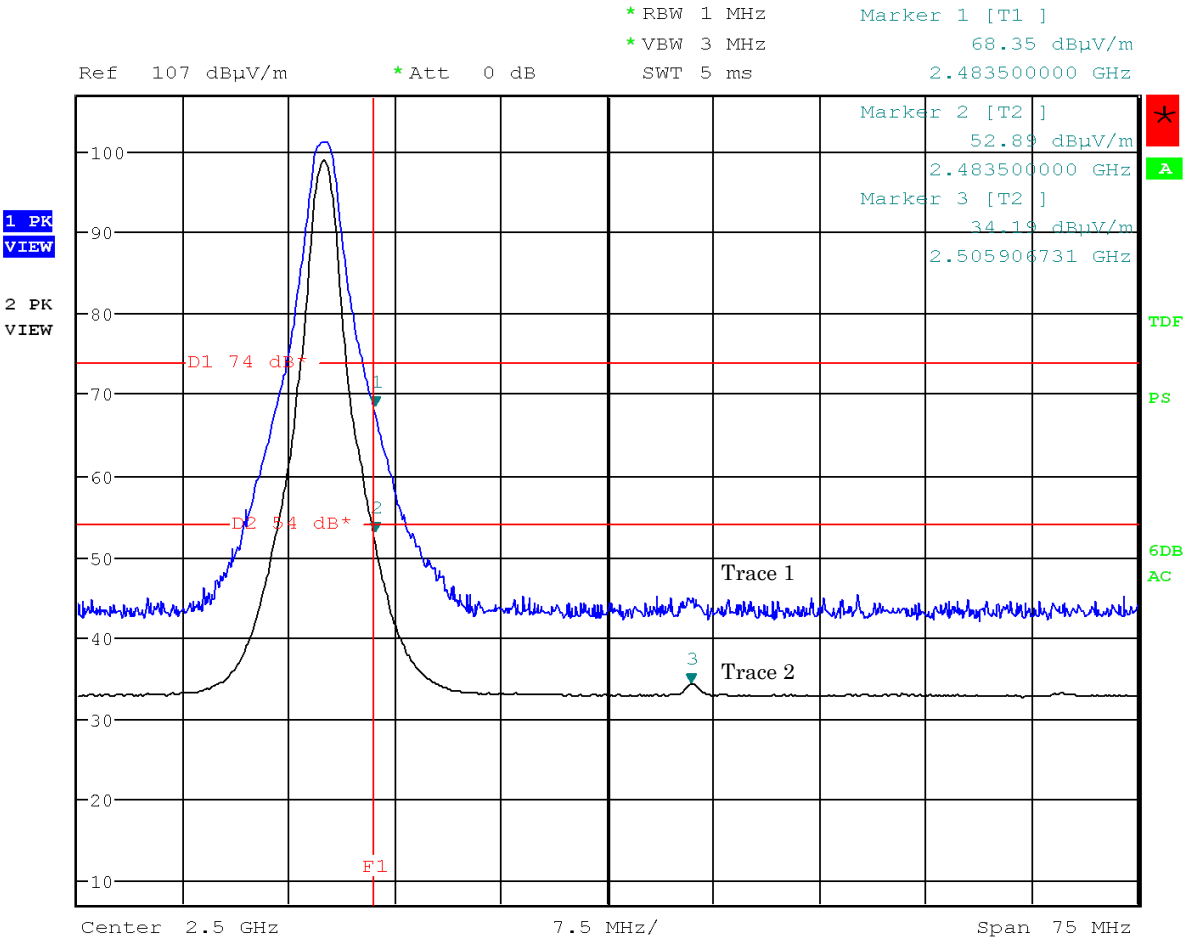
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : EDR, Hopping off (78ch: 2480 MHz) (worst case)
Antenna Polarization : Horizontal



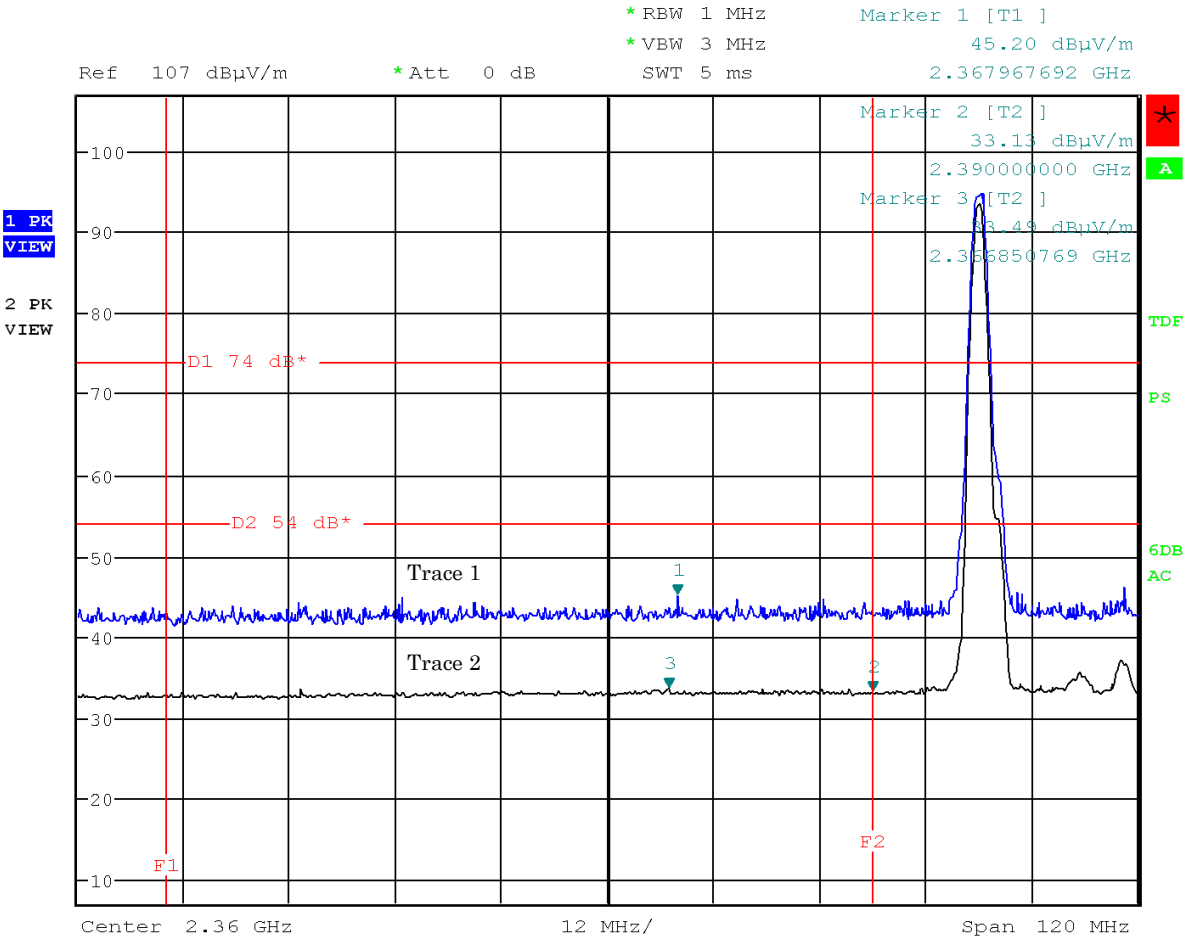
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : EDR, Hopping off (78ch: 2480 MHz) (worst case)
Antenna Polarization : Vertical



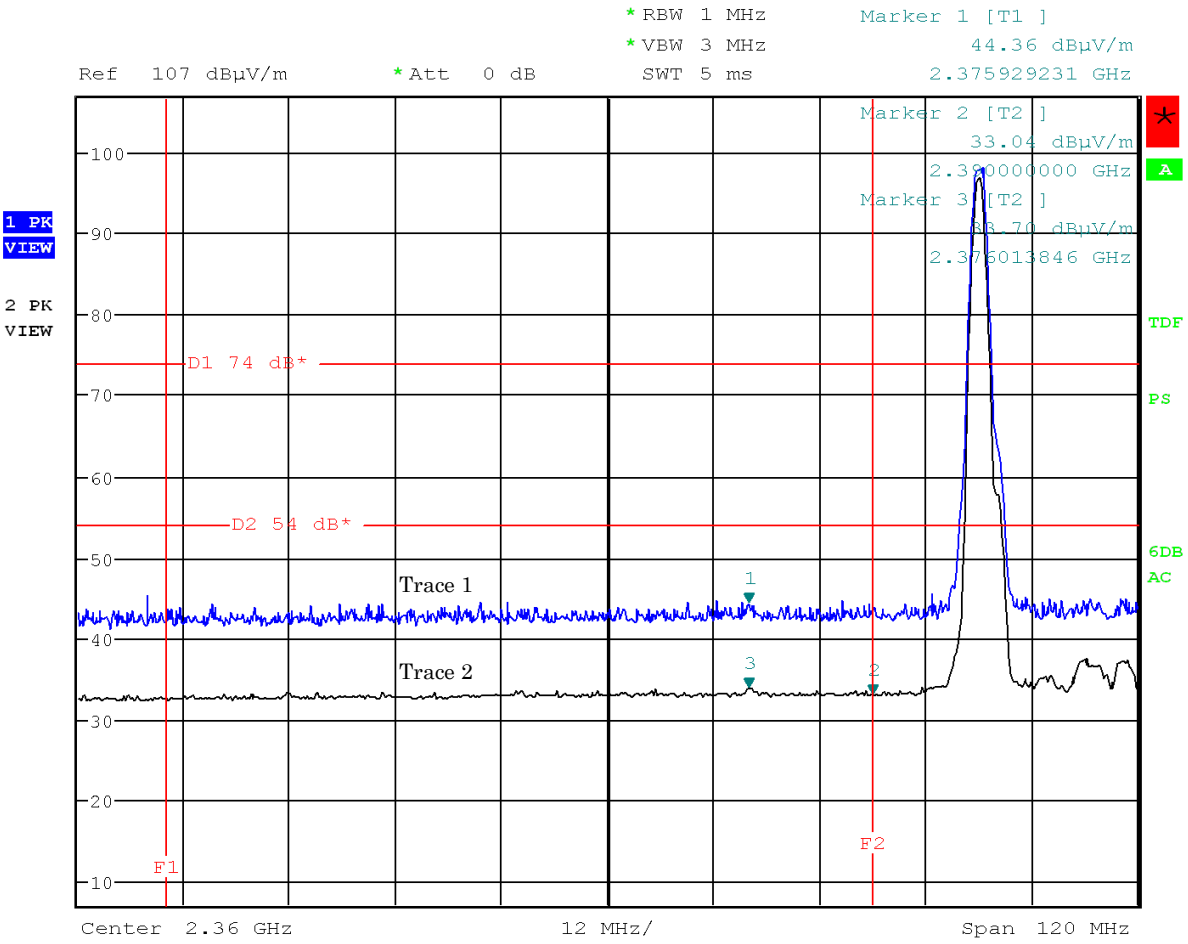
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : Bluetooth Low Energy, Hopping off (0ch: 2402 MHz)
Antenna Polarization : Horizontal



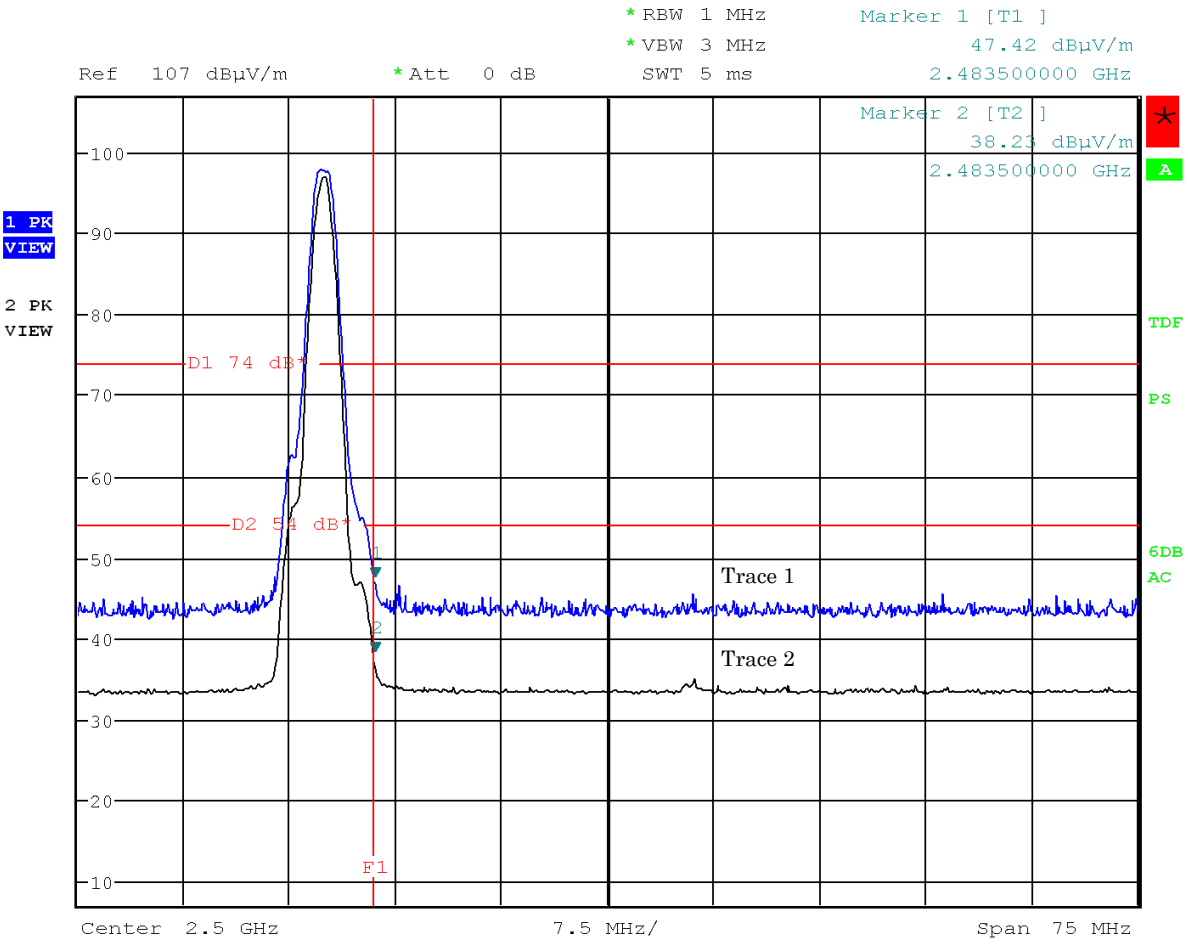
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : Bluetooth Low Energy, Hopping off (0ch: 2402 MHz)
Antenna Polarization : Vertical



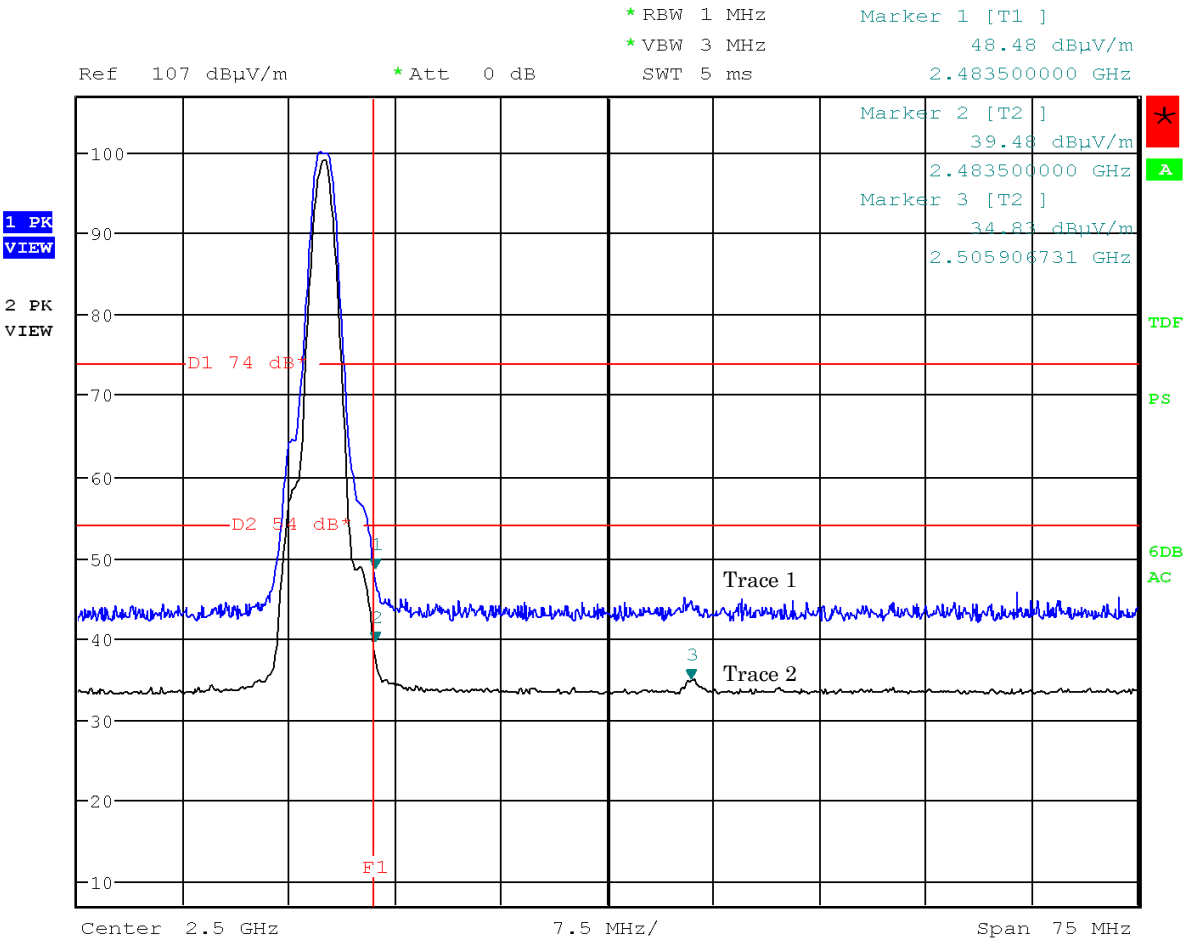
Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : Bluetooth Low Energy, Hopping off (39ch: 2480 MHz)
Antenna Polarization : Horizontal



Note: The trace 1 is Peak . The trace 2 is Average.

Mode of EUT : Bluetooth Low Energy, Hopping off (39ch: 2480 MHz)
Antenna Polarization : Vertical



Note: The trace 1 is Peak . The trace 2 is Average.

7.9.4.2 Other Spurious Emission (9kHz – 30MHz)

Test Date :July 27, 2018
Temp.:24°C, Humi.:70%, Atm.:991hPa

Mode of EUT : All modes have been investigated and the worst case mode has been listed.
Results : No spurious emissions in the range 20dB below the limit.

7.9.4.3 Other Spurious Emission (30MHz – 1000MHz)

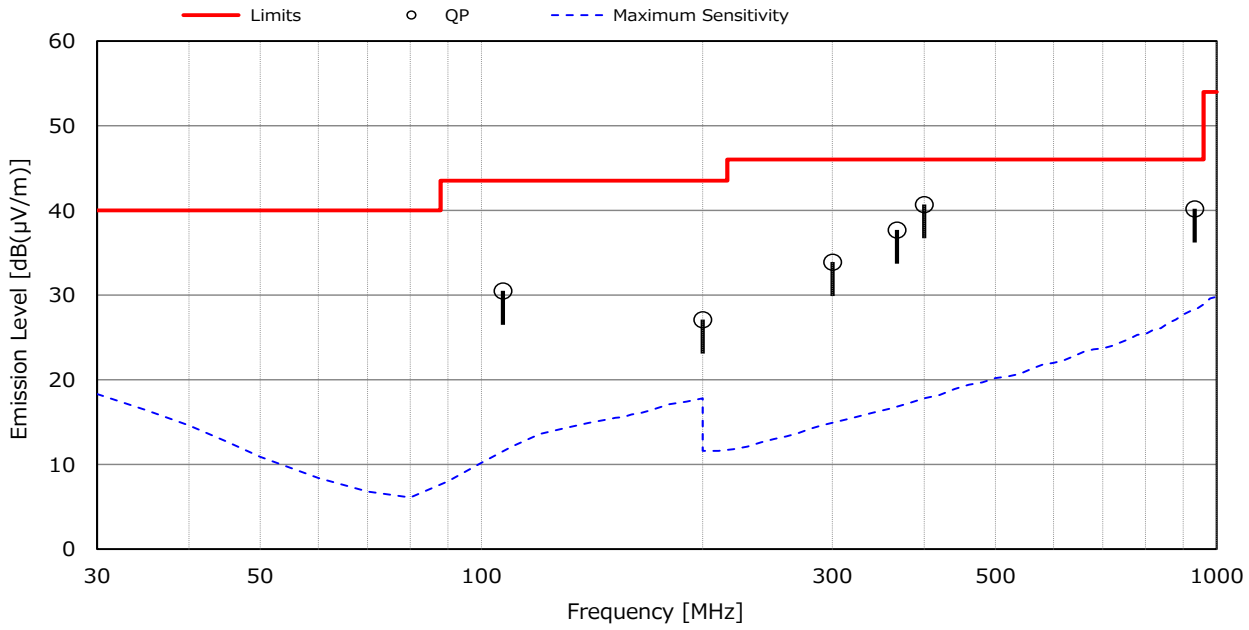
Mode of EUT : All modes have been investigated and the worst case mode has been listed.

Test voltage : 120VAC 60Hz

Test Date: July 27, 2018
Temp.: 24 °C, RH: 70 %, Atm.: 991 hPa

Antenna polarization : Horizontal

Frequency [MHz]	Factor [dB]	Readings [dB(μV)]	Limits [dB(μV/m)]	Results [dB(μV/m)]	Margin [dB]	Remarks
106.973	-15.4	45.9	43.5	30.5	+ 13.0	-
199.991	- 9.3	36.4	43.5	27.1	+ 16.4	-
300.275	-12.1	46.0	46.0	33.9	+ 12.1	-
367.275	-10.2	47.9	46.0	37.7	+ 8.3	-
400.001	- 9.2	49.9	46.0	40.7	+ 5.3	-
933.336	1.4	38.8	46.0	40.2	+ 5.8	-



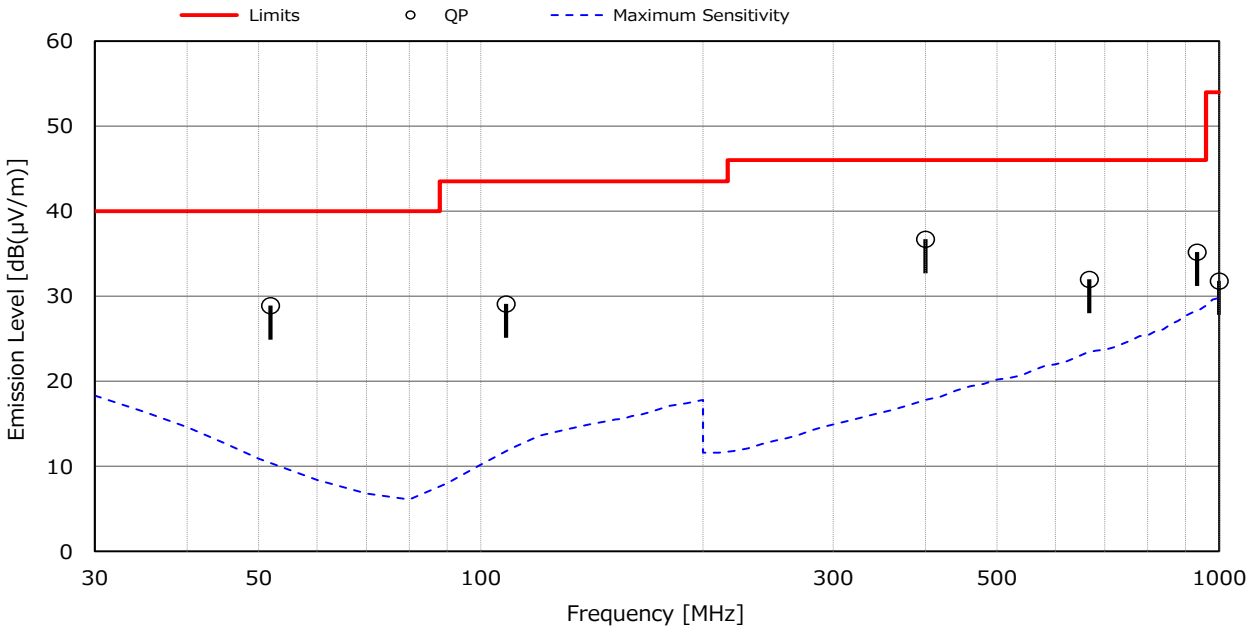
NOTES
1) Measurement Distance : 3 m
2) The spectrum was checked from 30 MHz to 1000 MHz.
3) The factor includes the antenna factor and the cable loss.
4) Calculated result as the worst point shown on underline :
Factor + Reading (QP) = -9.2 + 49.9 = 40.7 dB(μV) at 400.001 MHz
Antenna Height : 100 cm, Turntable Rotation Position : 279 °
5) QP : Quasi-Peak detector
6) Bandwidth : 120 kHz (30 MHz - 1000 MHz)

Test voltage : 120VAC 60Hz

Test Date: July 27, 2018
Temp.: 24 °C, RH: 70 %, Atm.: 991 hPa

Antenna polarization : Vertical

Frequency [MHz]	Factor [dB]	Readings [dB(μV)]	Limits [dB(μV/m)]	Results [dB(μV/m)]	Margin [dB]	Remarks
51.866	-16.5	45.4	40.0	28.9	+ 11.1	-
108.143	-15.2	44.3	43.5	29.1	+ 14.4	-
400.001	- 9.2	45.9	46.0	36.7	+ 9.3	-
666.668	- 3.7	35.7	46.0	32.0	+ 14.0	-
933.336	1.4	33.8	46.0	35.2	+ 10.8	-
999.932	2.8	29.0	54.0	31.8	+ 22.2	-



NOTES
1) Measurement Distance : 3 m
2) The spectrum was checked from 30 MHz to 1000 MHz.
3) The factor includes the antenna factor and the cable loss.
4) Calculated result as the worst point shown on underline :
Factor + Reading (QP) = -9.2 + 45.9 = 36.7 dB(μV) at 400.001 MHz
Antenna Height : 100 cm, Turntable Rotation Position : 125 °
5) QP : Quasi-Peak detector
6) Bandwidth : 120 kHz (30 MHz - 1000 MHz)

7.9.4.4 Other Spurious Emission (Above 1000MHz)

Mode of EUT : BDR (worst case)

Test Date: July 13, 2018
Temp.: 24 °C, Humi: 70 %

Frequency [MHz]	Antenna Factor [dB(1/m)]	Corr. Factor [dB]	D.C.F. [dB]	Meter Readings [dB(μV)] Horizontal PK	Horizontal AVE	Vertical PK	Vertical AVE	Limits [dB(μV/m)] PK	Limits AVE	Results [dB(μV/m)] PK	Results AVE	Margin [dB]	Remarks
Test condition : Tx Low Ch													
4804.0	33.0	-31.7	-24.8	57.6	54.9	58.0	55.4	74.0	54.0	59.3	31.9	+14.7	-
12010.0	39.2	-29.1	-24.8	41.7	31.8	< 40.0	< 30.0	74.0	54.0	51.8	17.1	+22.2	-
19216.0	-5.6	3.7	-24.8	< 50.0	40.3	< 50.0	< 40.0	74.0	54.0	< 48.1	13.6	> +25.9	-
Test condition : TX Middle Ch													
4882.0	33.1	-31.5	-24.8	58.4	56.1	57.8	55.4	74.0	54.0	60.0	32.9	+14.0	-
7323.0	36.4	-31.2	-24.8	49.8	44.5	47.0	41.1	74.0	54.0	55.0	24.9	+19.0	-
12205.0	39.0	-29.5	-24.8	43.2	32.4	40.8	< 30.0	74.0	54.0	52.7	17.1	+21.3	-
19528.0	-5.5	3.7	-24.8	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 48.2	< 13.4	> +25.8	-
Test condition : TX High Ch													
4960.0	33.3	-31.5	-24.8	53.3	50.2	54.6	51.5	74.0	54.0	56.4	28.5	+17.6	-
7440.0	36.6	-31.2	-24.8	51.4	46.3	48.2	42.3	74.0	54.0	56.8	26.9	+17.2	-
12400.0	38.8	-29.9	-24.8	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 48.9	< 14.1	> +25.1	-
19840.0	-5.7	3.7	-24.8	< 50.0	41.3	< 50.0	< 40.0	74.0	54.0	< 48.0	14.5	> +26.0	-
22320.0	-6.1	3.9	-24.8	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 47.8	< 13.0	> +26.2	-

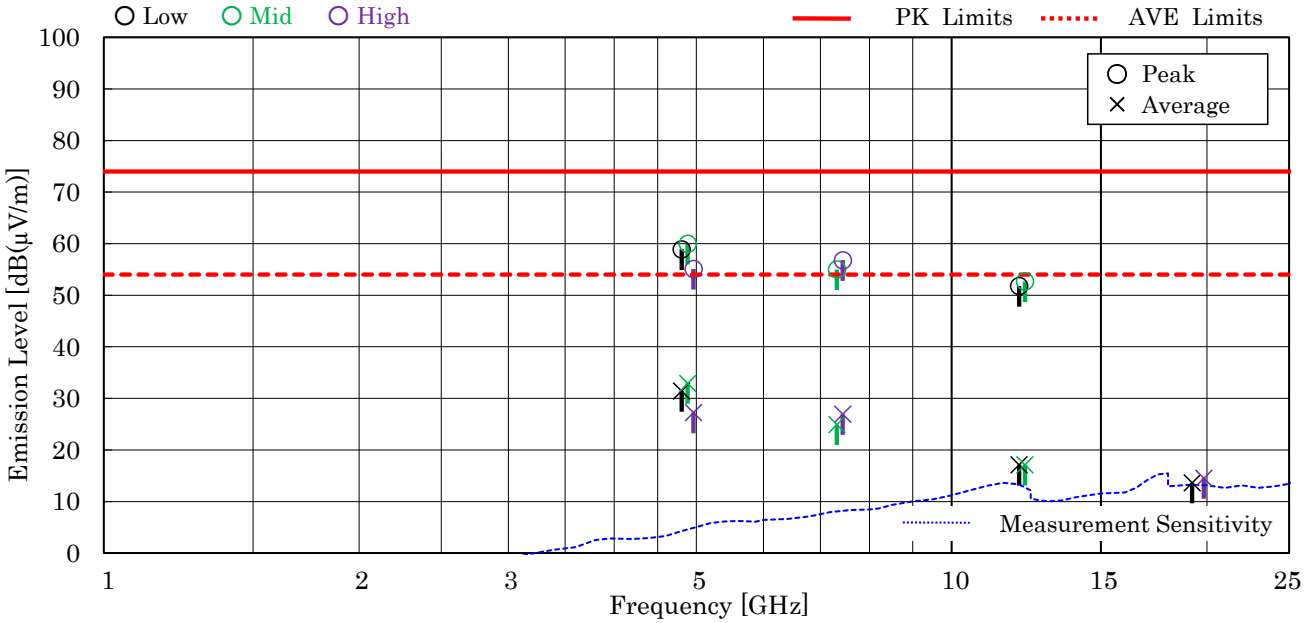
Calculated result at 4882.0 MHz, as the worst point shown on underline:

	Antenna Factor	=	33.1 dB(1/m)
	Corr. Factor	=	-31.5 dB
	D.C.F.(For AVE only)	=	0.0 dB
+)	Meter Reading	=	58.4 dB(μV)
	Result	=	60.0 dB(μV/m)

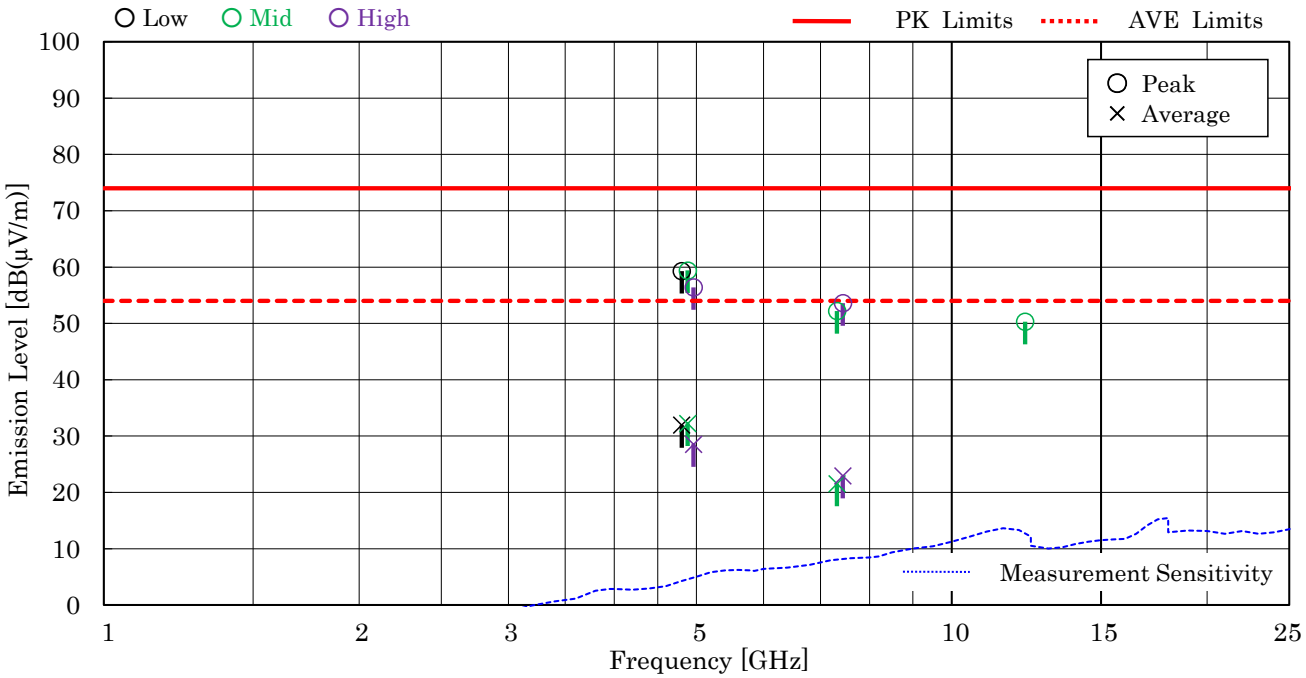
Minimum Margin: 74.0 - 60.0 = 14.0 (dB)

NOTES
1. Test Distance : 3 m
2. The spectrum was checked from 1 GHz to 25 GHz (10th harmonic of the highest fundamental frequency).
3. The correction factor is shown as follows:
   Corr. Factor [dB] = Cable Loss + 20dB Pad Att. - Pre-Amp. Gain [dB] (1.0 - 8.2 GHz)
   Corr. Factor [dB] = Cable Loss + 10dB Pad Att. - Pre-Amp. Gain [dB] (8.2 - 18.0 GHz)
   Corr. Factor [dB] = Cable Loss - Pre-Amp. Gain [dB] (over 18 GHz)
4. The symbol of "<" means "or less".
5. The symbol of ">" means "more than".
6. PK : Peak / AVE : Average
7. D.C.F. Calculation. (D.C.F. ; Duty Cycle Correction Factor)
   - Time to cycle through all channels = t = T [ms] × 20 (AFH minimum hopping channels), where T = burst on duration
   - 100 ms / t = h --> Round up to next highest integer, to account for worst case, H
   - The Worst Case Dwell Time [ms] = T × H (For this case, T = 2.89 ms, H =2, 2.89 × 2 = 5.78)
   - D.C.F. [dB] = 20 × log(The Worst Case Dwell Time / 100 [ms]) = 20 × log(5.78 /100) = -24.8

TX Low/Middle/High ch (Horizontal)



TX Low/Middle/High ch (Vertical)



Mode of EUT : LE

Test Date: July 13, 2018
Temp.: 24 °C, Humi: 70 %

Frequency [MHz]	Antenna Factor [dB(1/m)]	Corr. Factor [dB]	Meter Readings [dB(μV)] Horizontal PK	Horizontal AVE	Vertical PK	Vertical AVE	Limits [dB(μV/m)] PK	Limits AVE	Results [dB(μV/m)] PK	Results AVE	Margin [dB]	Remarks
Test condition : Tx Low Ch												
4804.0	33.0	-31.7	54.5	49.8	54.6	49.8	74.0	54.0	55.9	51.1	+ 2.9	-
12010.0	39.2	-29.1	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 50.1	< 40.1	> +13.9	-
19216.0	-5.6	3.7	< 50.0	41.2	< 50.0	40.3	74.0	54.0	< 48.1	39.3	+14.7	-
Test condition : TX Middle Ch												
4880.0	33.1	-31.6	55.9	51.7	55.7	51.4	74.0	54.0	57.4	53.2	+ 0.8	-
7320.0	36.4	-31.2	42.2	33.3	40.7	30.7	74.0	54.0	47.4	38.5	+15.5	-
12200.0	39.0	-29.4	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 49.6	< 39.6	> +14.4	-
19520.0	-5.5	3.7	< 50.0	40.3	< 50.0	< 40.0	74.0	54.0	< 48.2	38.5	+15.5	-
Test condition : TX High Ch												
4960.0	33.3	-31.5	53.6	49.1	52.0	47.5	74.0	54.0	55.4	50.9	+ 3.1	-
7440.0	36.6	-31.2	44.8	36.8	41.8	33.0	74.0	54.0	50.2	42.2	+11.8	-
12400.0	38.8	-29.9	< 40.0	< 30.0	< 40.0	< 30.0	74.0	54.0	< 48.9	< 38.9	> +15.1	-
19840.0	-5.7	3.7	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 48.0	< 38.0	> +16.0	-
22320.0	-6.1	3.9	< 50.0	< 40.0	< 50.0	< 40.0	74.0	54.0	< 47.8	< 37.8	> +16.2	-

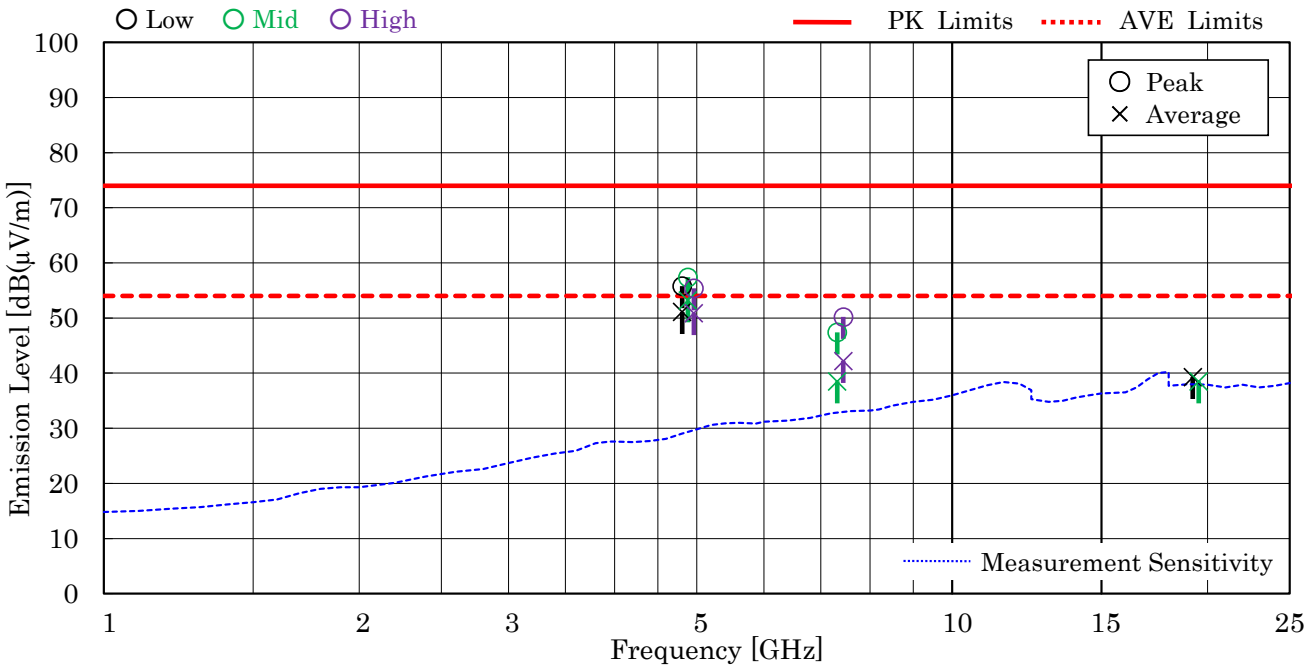
Calculated result at 4880.0 MHz, as the worst point shown on underline:

	Antenna Factor	=	33.1 dB(1/m)
	Corr. Factor	=	-31.6 dB
+)	Meter Reading	=	51.7 dB(μV)
	Result	=	53.2 dB(μV/m)

Minimum Margin: 54.0 - 53.2 = 0.8 (dB)

NOTES
1. Test Distance : 3 m
2. The spectrum was checked from 1 GHz to 25 GHz (10th harmonic of the highest fundamental frequency).
3. The correction factor is shown as follows:
   Corr. Factor [dB] = Cable Loss + 20dB Pad Att. - Pre-Amp. Gain [dB] (1.0 - 8.2 GHz)
   Corr. Factor [dB] = Cable Loss + 10dB Pad Att. - Pre-Amp. Gain [dB] (8.2 - 18.0 GHz)
   Corr. Factor [dB] = Cable Loss - Pre-Amp. Gain [dB] (over 18 GHz)
4. The symbol of "<" means "or less".
5. The symbol of ">" means "more than".
6. PK : Peak / AVE : Average

TX Low/Middle/High ch (Horizontal)



TX Low/Middle/High ch (Vertical)