

TEST REPORT

Applicant : DATECS Ltd.

Address : 1592 Sofia, Bulgaria, 4 Datecs

Products : Bluetooth Module

Model No. : BTIOSDT

Serial No. : -

Test Standard : CFR 47 FCC Rules and Regulations Part 15

Test Results : Passed

Date of Test : July 7 - 18, 2014



VLAC
Lab Accreditation
VLAC-001-1

A handwritten signature in black ink, reading 'H. Kajiwara', is written over a horizontal line.

Hideki Kajiwara

Manager

Japan Quality Assurance Organization

SAFETY & EMC CENTER

Testing Dept.

EMC Testing Div.

1-21-25, Kinuta, Setagaya-ku, Tokyo 157-8573, Japan

-
- The measurement values stated in Test Report was made with traceable to National Institute of Advanced Industrial Science and Technology (AIST) of Japan and National Institute of Information and Communications Technology (NICT) of Japan.
 - 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” means Equipment Under the Test.

“AE” means Associated Equipment.

“N/A” means that Not Applicable.

“N/T” means that Not Tested.

☒ - 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 | : | DATECS Ltd.
1592 Sofia, Bulgaria, 4 Datecs |
| 2 | Products | : | Bluetooth Module |
| 3 | Model No. | : | BTIOSDT |
| 4 | Host Equipment | : | Mobile Thermal Printer
Model No. DPP-250
DPP-450L |
| 5 | Serial No. | : | DPP-250
MAR001274UN14
MAR001275UN14
DPP-450L
MAR001286UN14 |
| 6 | Product Type | : | Mass Production |
| 7 | Date of Manufacture | : | - |
| 8 | Power Rating | : | 3.3 VDC (from the Host Equipment) |
| 9 | Grounding | : | None |
| 10 | Transmitting Frequency | : | 2402.0 MHz(00CH) – 2480.0MHz(78CH) |
| 11 | Receiving Frequency | : | 2402.0 MHz(00CH) – 2480.0MHz(78CH) |
| 12 | Max. RF Output Power | : | 4.90 dBm(Measure Value) |
| 13 | Antenna Type | : | Chip Antenna (Integral) |
| 14 | Antenna Gain | : | -2.0 dBi |
| 15 | Category | : | Spread Spectrum Transmitter(FHSS) |
| 16 | EUT Authorization | : | Certification |
| 17 | Received Date of EUT | : | July 7, 2014 |
| 18 | Channel Plan | : | 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:

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

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:

Tested by:



Yuichi Fukumoto
Advisor
SAFETY & EMC CENTER
Testing Dept.
EMC Testing Div.



Naohiko Ueno
Engineer
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EMC Testing Div.

3 Test Procedure

Test Requirements : §15.247, §15.207 and §15.209

Test Procedure : ANSI C63.10-2009

The tests were performed with reference to the FCC Public Notice DA 00-705, released March 30, 2000.

4 Test Location

Japan Quality Assurance Organization

SAFETY & EMC CENTER

Testing Dept.

EMC Testing Div.

1-21-25, Kinuta, Setagaya-ku, Tokyo 157-8573, Japan

5 Recognition of Test Laboratory

Japan Quality Assurance Organization, Safety & EMC Center Testing Dept. EMC Testing Div. is accredited under ISO/IEC 17025 by following accreditation bodies and the test facility of Testing Division is registered by the following bodies .

VLAC Code : VLAC-001-1 (Effective through : March 30, 2016)

VCCI Registration Number : A-0001 (Effective through : March 30, 2016)

FCC Registration Number : 349652 (Effective through : March 30, 2016)

IC Registration Number : 2079A-1, 2079A-2 (Effective through : October 23, 2015)

Accredited as conformity assessment body for Japan electrical appliances and material law by METI. (Effective through : February 22, 2016)

6 The Details of the Equipment Under Test

6.1 Test Configuration

The EUT consists of :

Sign	Item	Manufacturer	Model No.	Serial No.	FCC ID
A	Bluetooth Module	DATECS Ltd.	BTIOSDT	-	YRWDATECSBTIOS

The AE used for testing :

Sign	Item	Manufacturer	Model No.	Serial No.	FCC ID
B	Mobile Thermal Printer	DATECS Ltd.	DPP-250	MAR001274UN14 ^{*1} MAR001275UN14 ^{*2}	DoC
C	Mobile Thermal Printer	DATECS Ltd.	DPP-450L	MAR001286UN14 ^{*2}	DoC
D	AC Adapter	DATECS Ltd.	SA110C-09S-1	-	N/A
E	AC Adapter	DATECS Ltd.	EA11003B-190	-	N/A

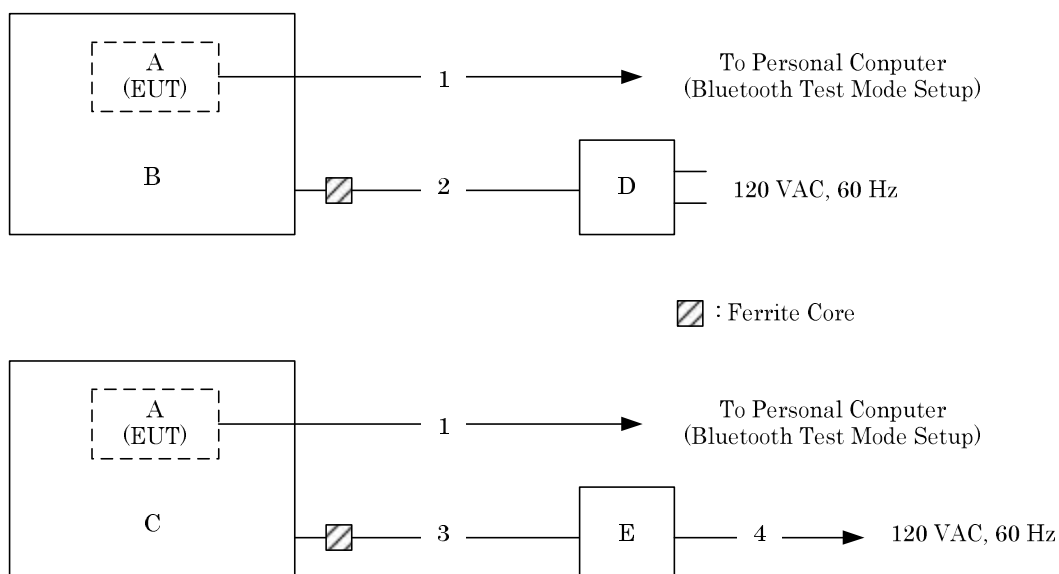
*1) Used for Antenna Conducted Emission

*2) Used for Field Strength of Spurious Emission

Type of Cable used for testing :

No.	Description	Identification (Manu. etc.)	Connector Shielded	Cable Shielded	Ferrite Core	Length (m)
1	Bluetooth Control Cable	-	No	No	No	1.5
2	DC Power Cable	-	No	No	Yes	1.5
3	DC Power Cable	-	No	No	Yes	1.2
4	AC Power Cable	-	No	No	No	1.5

6.2 Test Arrangement (Drawings)



6.3 Operating Condition

Transmitting/Receiving

Bluetooth 2.0 + EDR

Transmitting frequency : 2402.0 MHz(0CH) – 2480.0 MHz(78CH)

Receiver frequency : 2402.0 MHz(0CH) – 2480.0 MHz(78CH)

The test were carried under 2 mode shown as follows:

1) BDR

2) EDR

In Spurious Emissions(Conducted) and Radiated Emissions, the worst case is BDR mode.

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)

The EUT not have inquiry mode because it was Slave device.

The EUT was rotated through three orthogonal axis (X, Y and Z axis) in radiated measurement.

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

7 The Details of the Test Items

Test Item	FCC Specification	Reference of the Test Report	Results	Remarks
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)	-	-	-
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 2.1093	Section 7.10	Passed	-

7.1 Channel Separation

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

For the limits, ☒ - Passed ☐ - Failed ☐ - Not judged

7.1.1 Worst Point and Measurement Uncertainty

Channel Separation is 0.998 MHz
 Channel Separation(Inquiry) is N/A MHz

Uncertainty of Measurement Results +/-0.9 %(2σ)

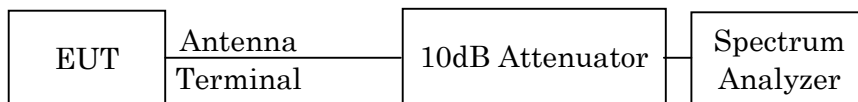
Remarks : _____

7.1.2 Test Site and Instruments

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Receiver	ESI26	Rohde & Schwarz	13	2014/6	1 Year
RF Cable	S 04272B	SUHNER	45	2014/5	1 Year
Attenuator	43KC-10	Anritsu	80	2013/10	1 Year

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 18, 2014

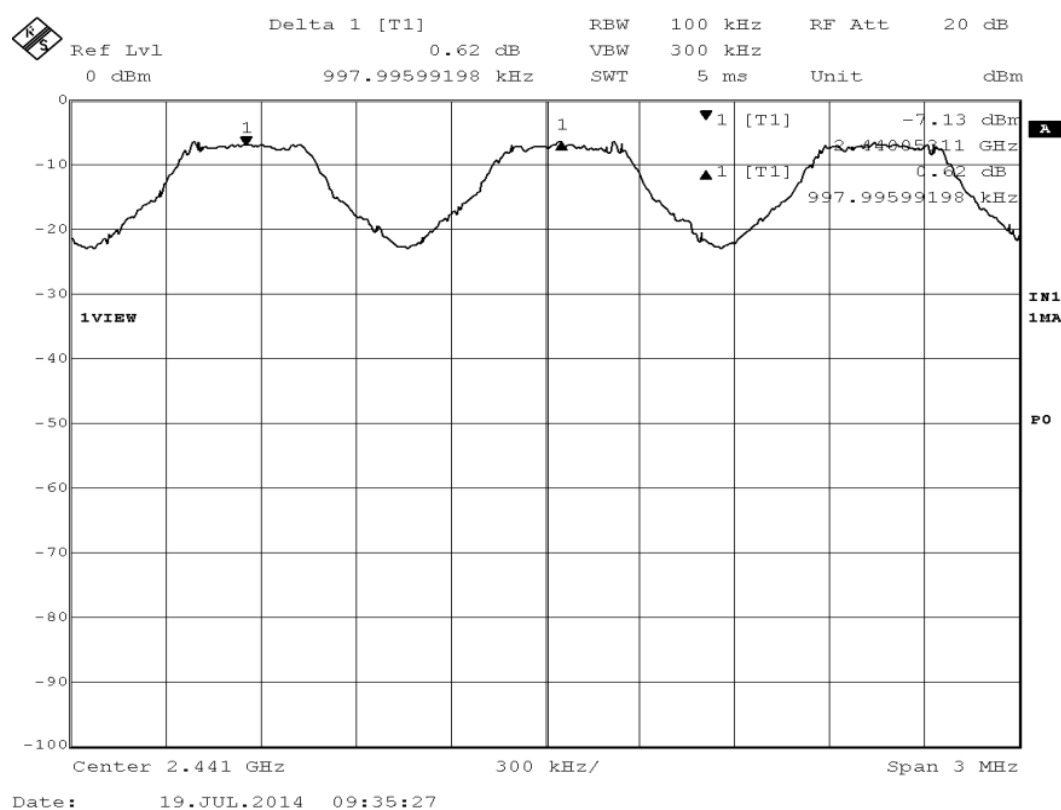
Temp.:25°C, Humi:60%

Mode of EUT	Channel Separation (MHz)	Limit* (MHz)
Hopping	0.998	0.862
Inquiry	-	-

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

The EUT not have inquiry mode because it was Slave device.

Mode of EUT : Hopping



7.2 Minimum Hopping Channel

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

For the limits, ☒ - Passed ☐ - Failed ☐ - Not judged

7.2.1 Worst Point and Measurement Uncertainty

Number of Channel is 79
 Number of Channel (Inquiry) is N/A
 Number of Channel (AFH) is 20

Uncertainty of Measurement Results +/-0.9 %(2σ)

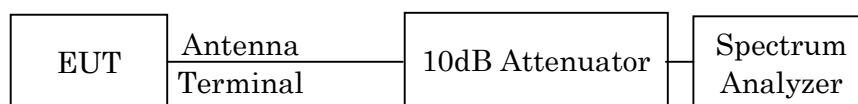
Remarks : _____

7.2.2 Test Site and Instruments

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Receiver	ESI26	Rohde & Schwarz	13	2014/6	1 Year
RF Cable	S 04272B	SUHNER	45	2014/5	1 Year
Attenuator	43KC-10	Anritsu	80	2013/10	1 Year

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

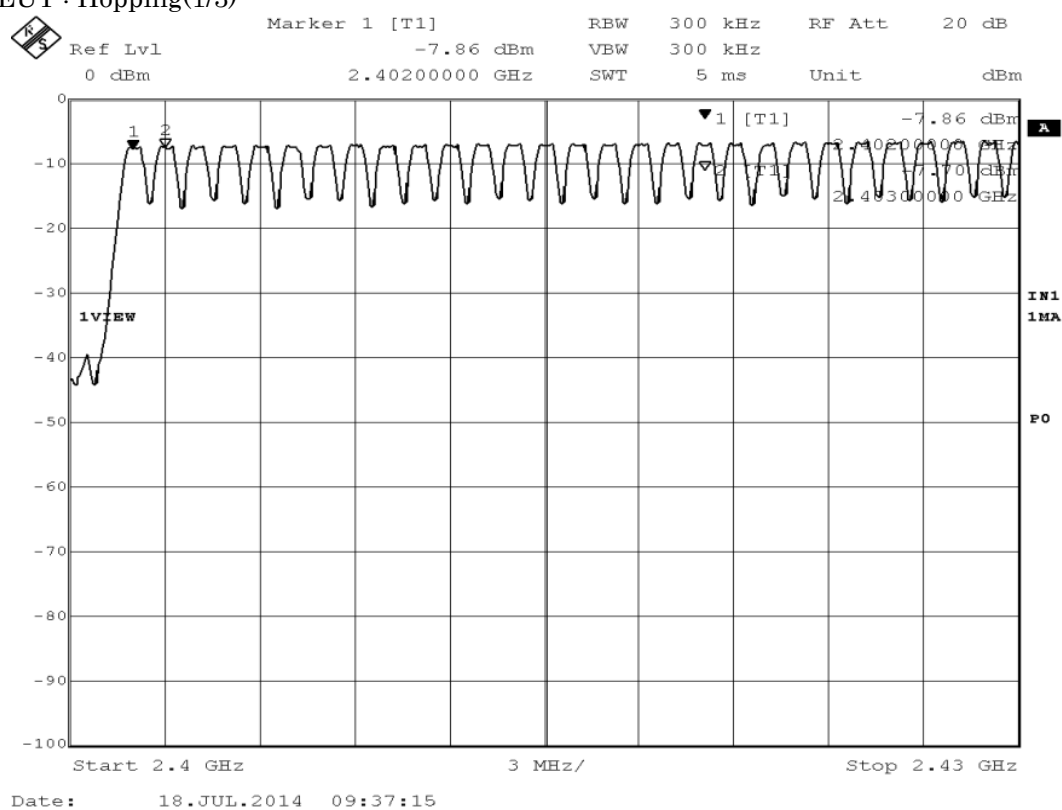
Test Date : July 18, 2014

Temp.:24°C, Humi:60%

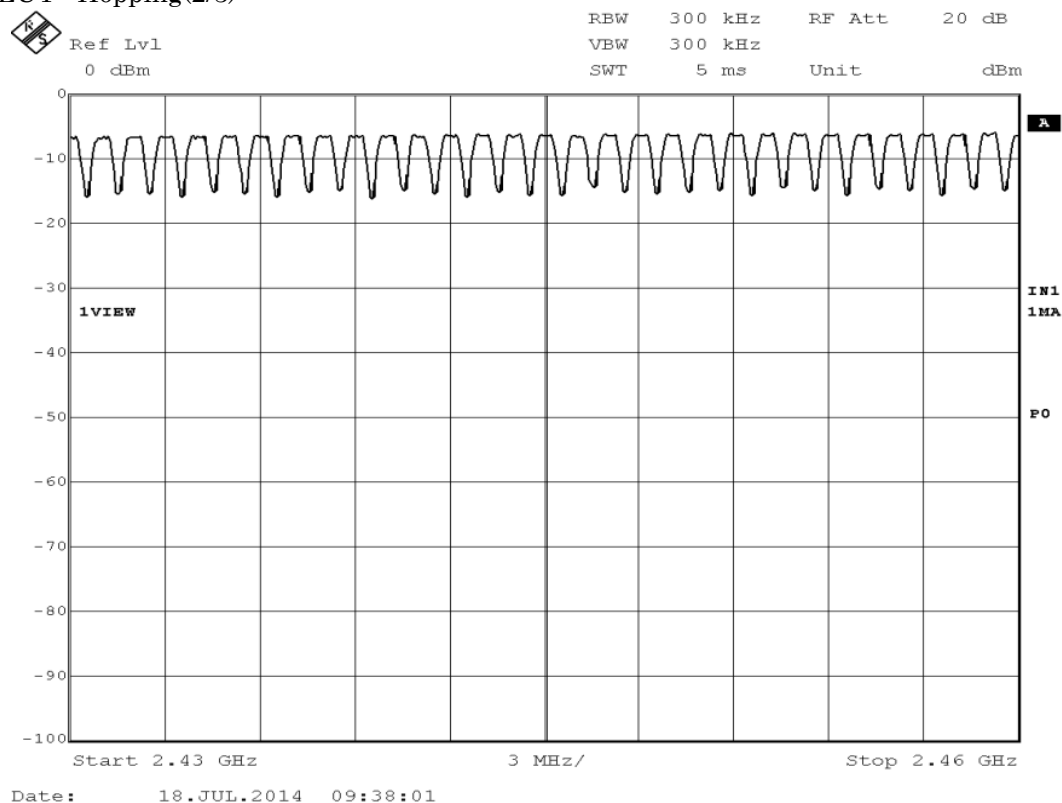
Mode of EUT	Minimum Hopping Channel	Limit
Hopping	79	15
Inquiry	-	-
AFH(minimum)	20	15

Note : The EUT not have inquiry mode because it was Slave device.

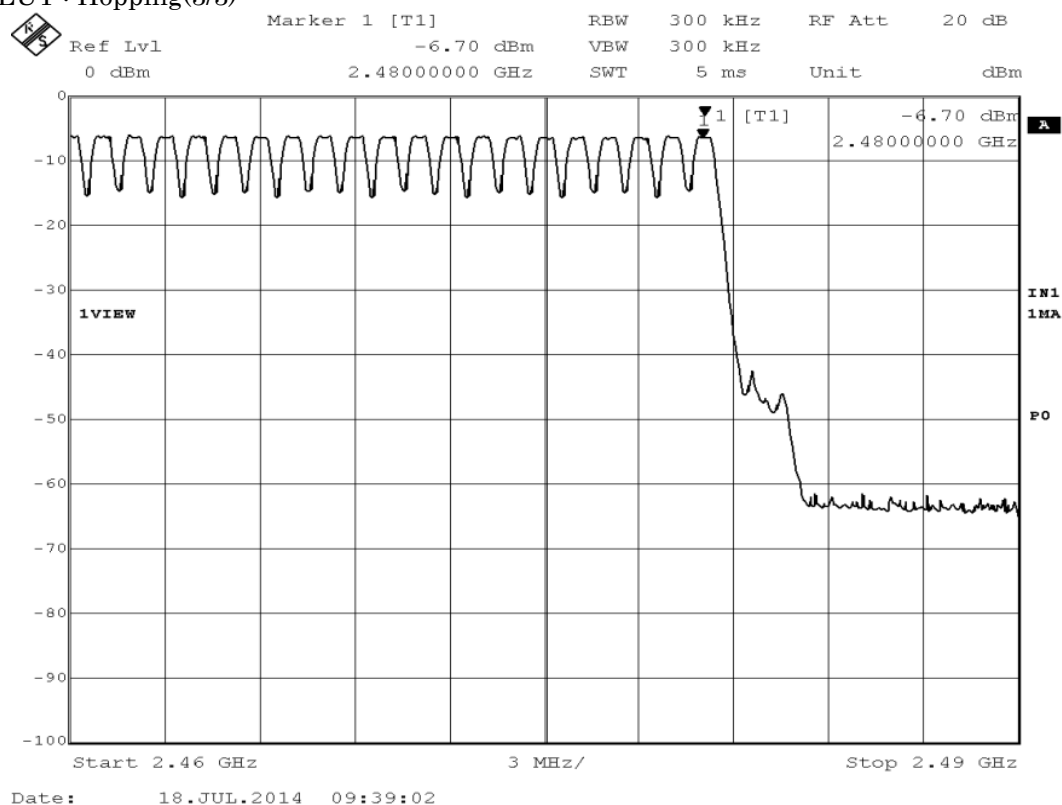
Mode of EUT : Hopping(1/3)



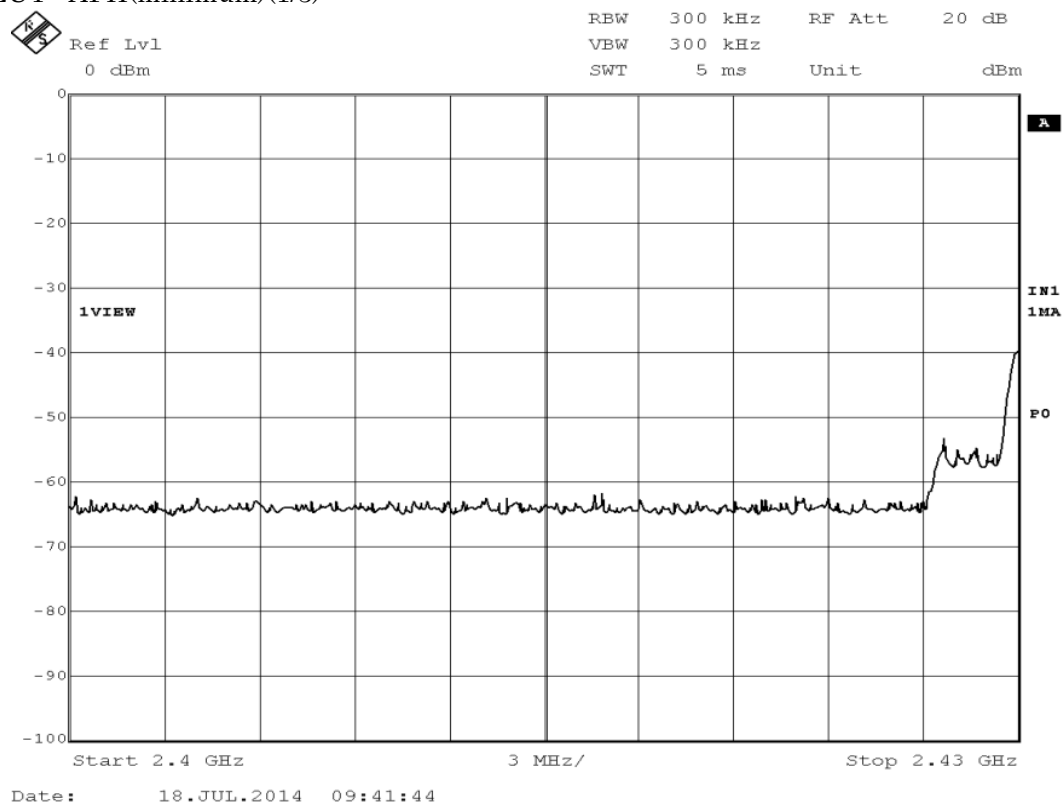
Mode of EUT : Hopping(2/3)



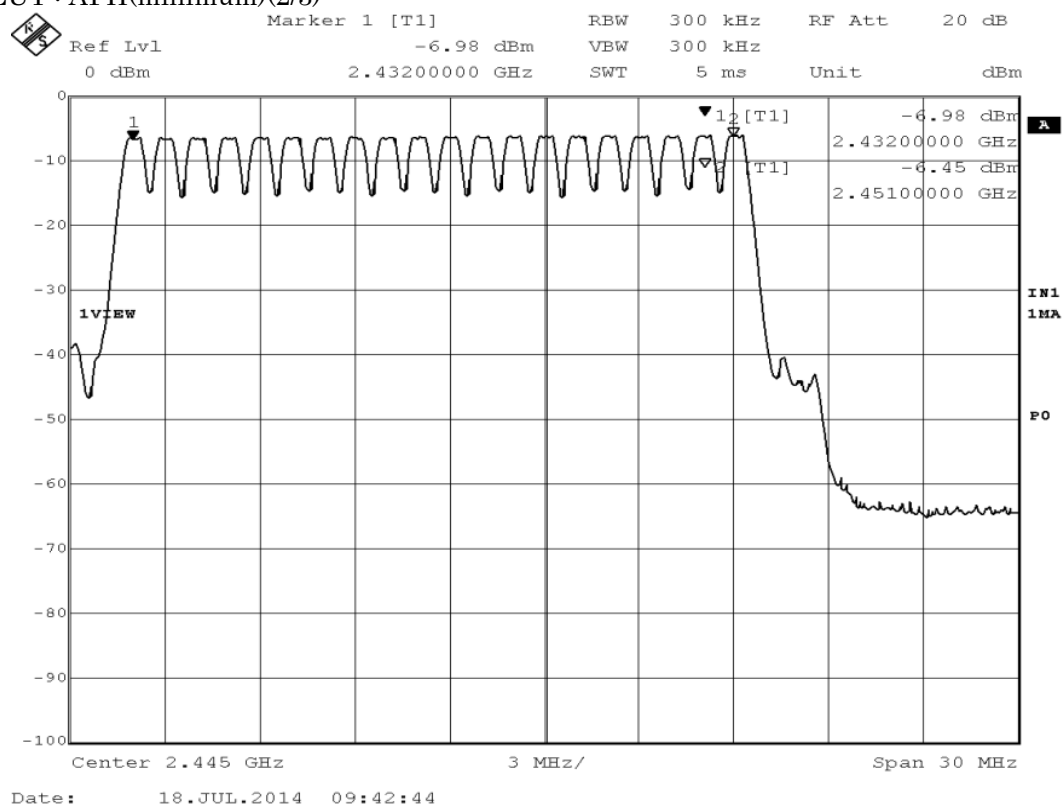
Mode of EUT : Hopping(3/3)



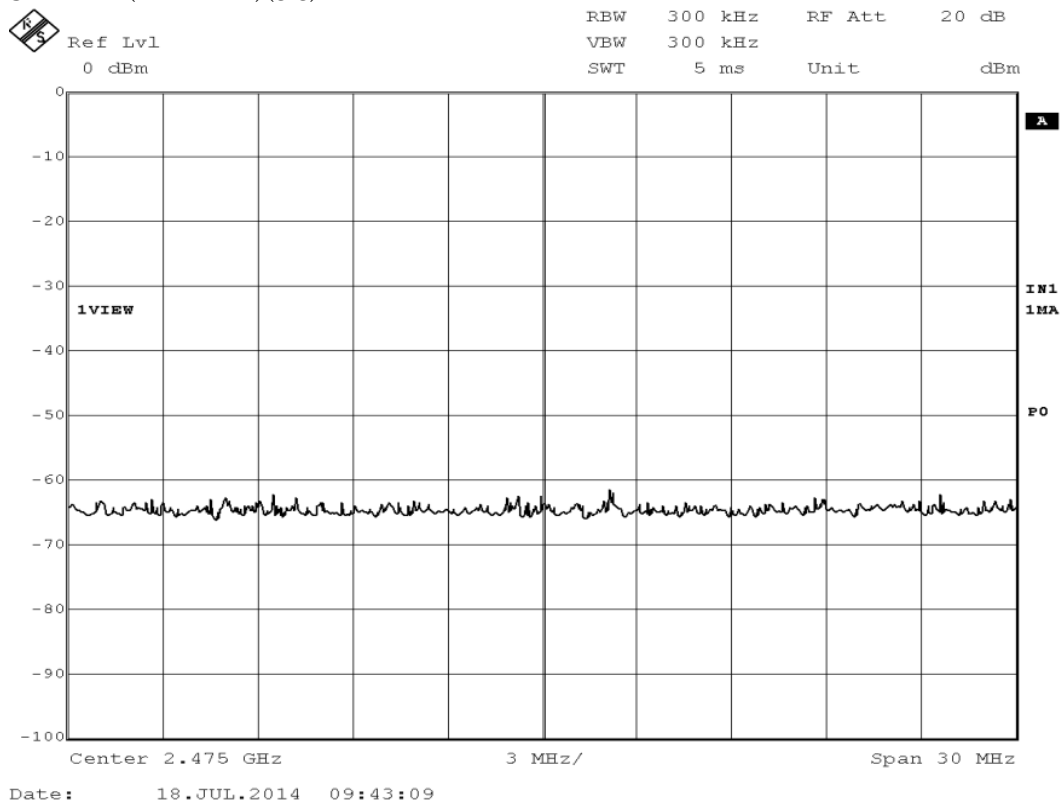
Mode of EUT : AFH(minimum)(1/3)



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

For the limits, ☒ - Passed ☐ - Failed ☐ - Not judged

7.3.1 Worst Point and Measurement Uncertainty

The 99% Bandwidth is 1208.4 kHz at 2402.0 MHz
The 20dB Bandwidth is 1292.6 kHz at 2402.0 MHz

Uncertainty of Measurement Results +/-0.9 %(2σ)

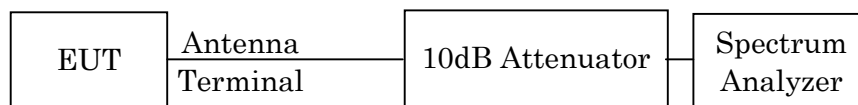
Remarks : _____

7.3.2 Test Site and Instruments

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Receiver	ESI26	Rohde & Schwarz	13	2014/6	1 Year
RF Cable	S 04272B	SUHNER	45	2014/5	1 Year
Attenuator	43KC-10	Anritsu	80	2013/10	1 Year

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:

Res. Bandwidth	30 kHz
Video Bandwidth	100 kHz
Span	3 MHz
Sweep Time	AUTO
Trace	Maxhold

7.3.4 Test Data

Mode of EUT : BDR+EDR

Date : July 18, 2014

Temp. : 25 °C

Humi. : 60 %

The resolution bandwidth was set to about 1% 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)

Cannel	Frequency (MHz)	99% Bandwidth (kHz)	-20dBc Bandwidth	Two-thirds of the 20 dB bandwidth (kHz)
00	2402.0	871.7	829.7	553.1
39	2441.0	877.8	889.8	593.2
78	2480.0	871.7	865.7	577.2

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

Cannel	Frequency (MHz)	99% Bandwidth (kHz)	-20dBc Bandwidth	Two-thirds of the 20 dB bandwidth (kHz)
00	2402.0	1208.4	1274.5	849.7
39	2441.0	1196.4	1220.4	813.6
78	2480.0	1184.4	1214.4	809.6

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

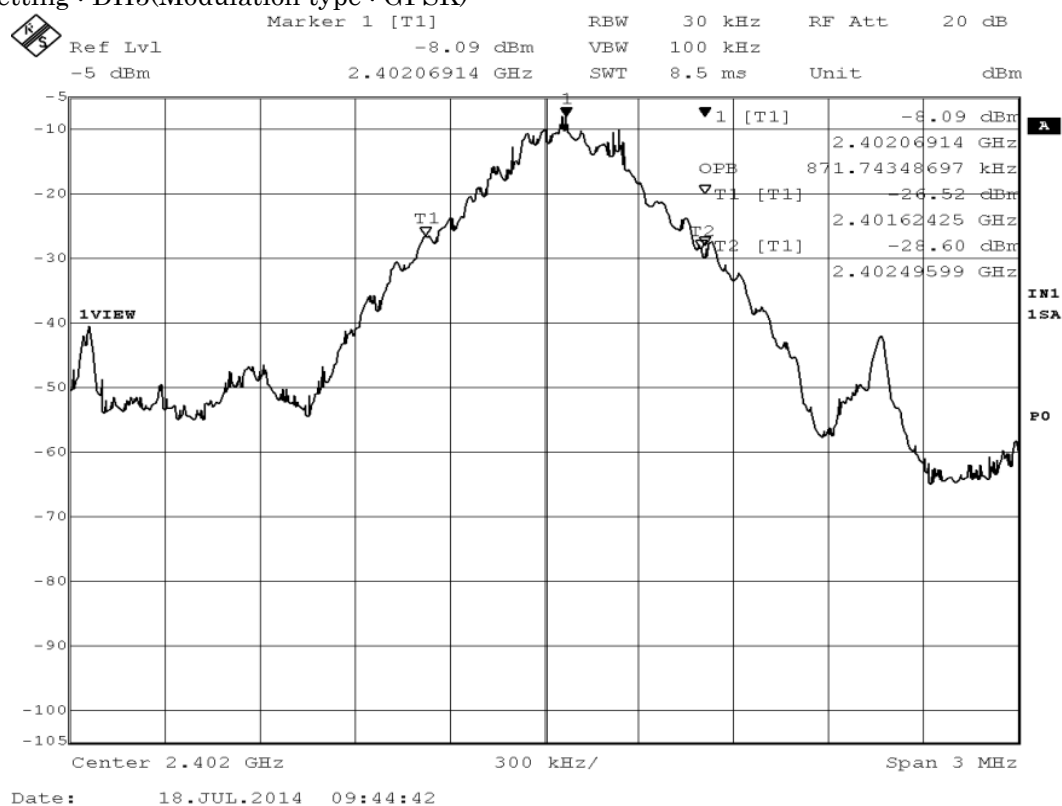
Cannel	Frequency (MHz)	99% Bandwidth (kHz)	-20dBc Bandwidth	Two-thirds of the 20 dB bandwidth (kHz)
00	2402.0	1196.4	1292.6	861.7
39	2441.0	1202.4	1292.6	861.7
78	2480.0	1190.4	1268.5	845.7

Mode of EUT : Inquiry

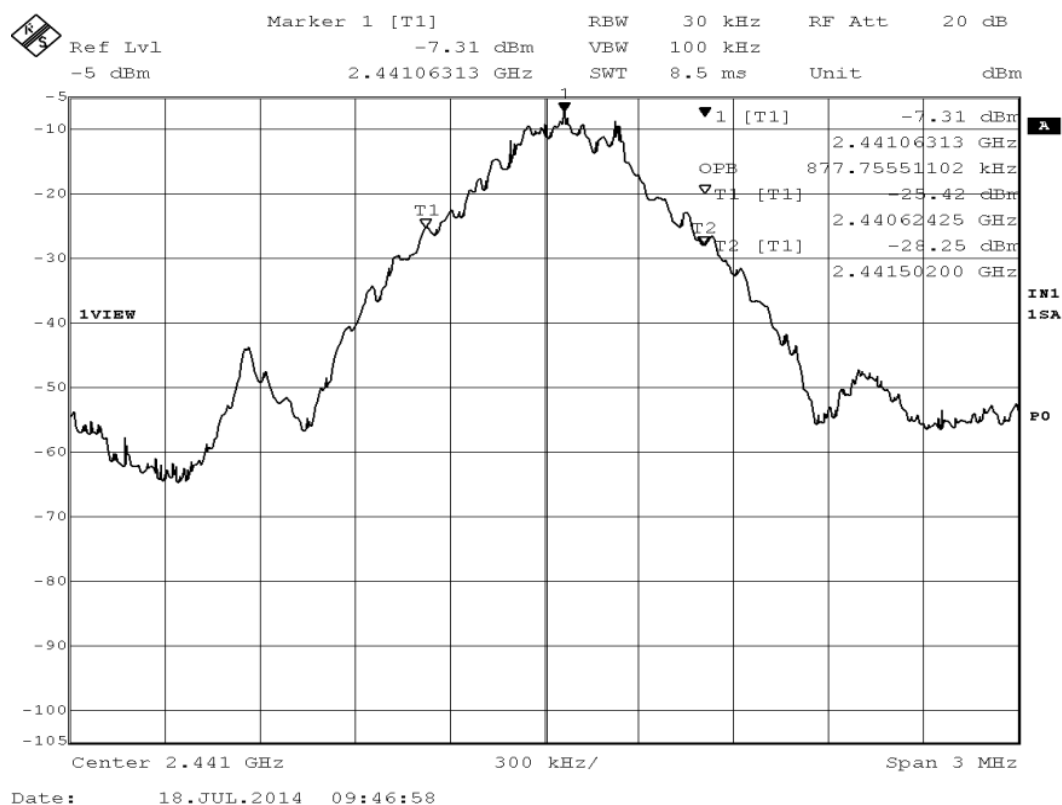
The EUT not have inquiry mode because it was Slave device.

7.3.4.1 99% Bandwidth

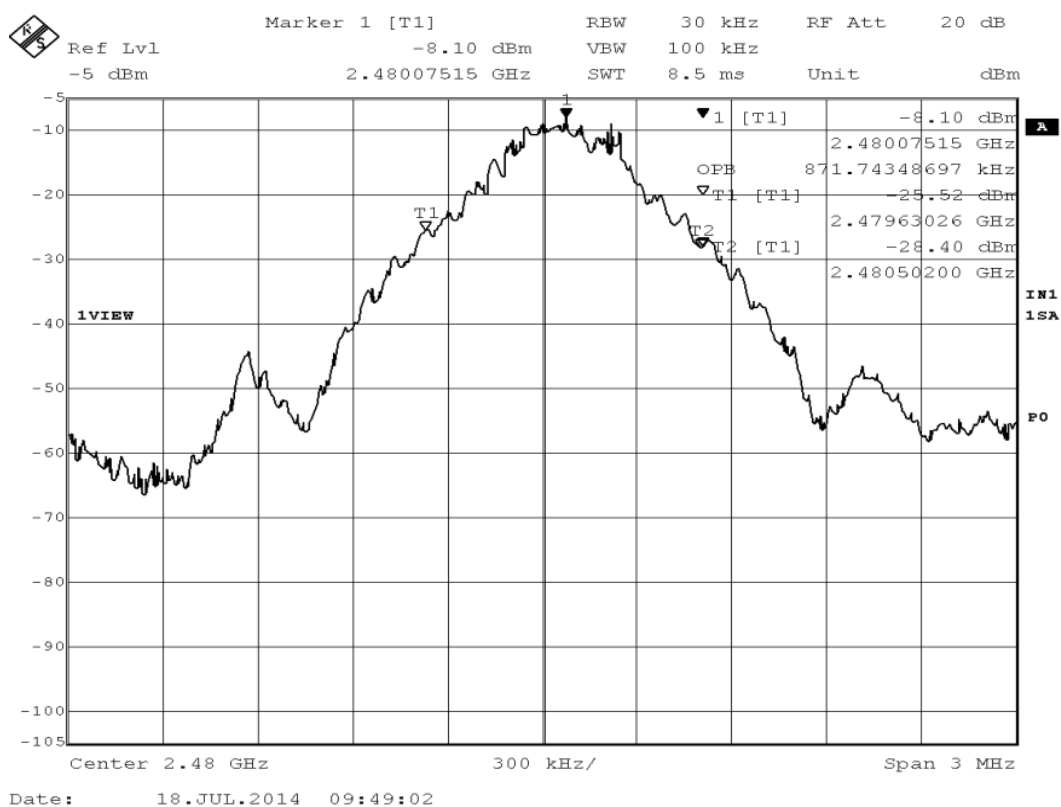
1) Packet Setting : DH5 (Modulation type : GFSK)



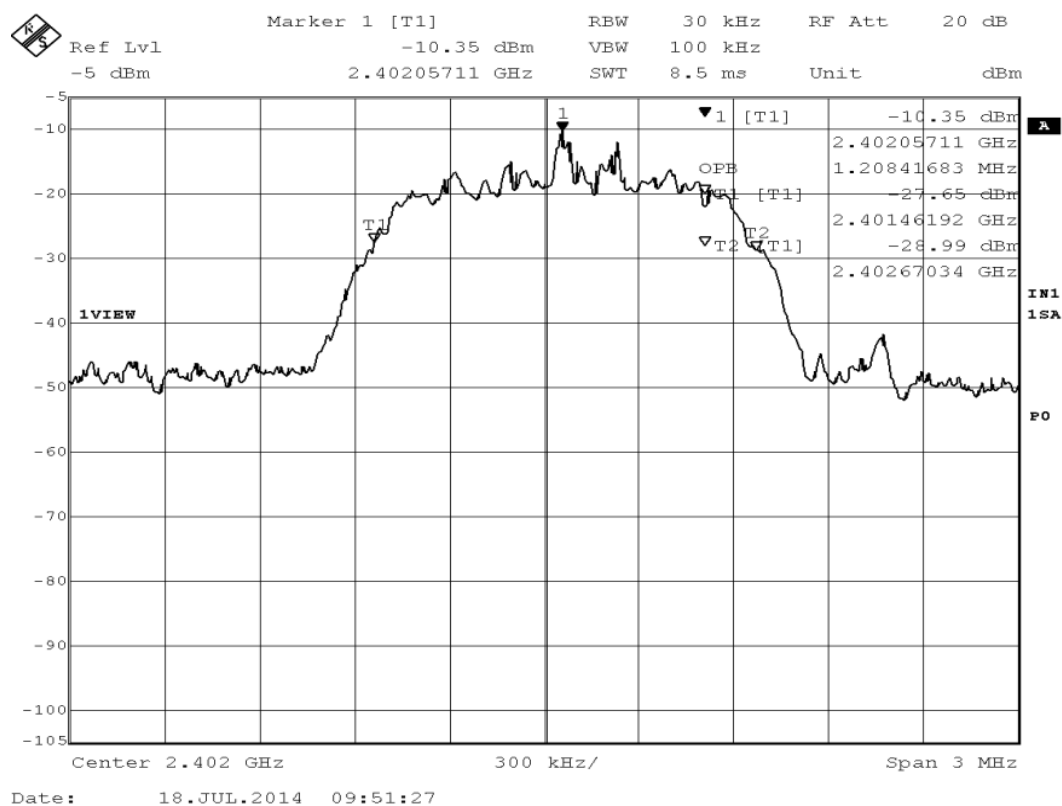
Low Channel



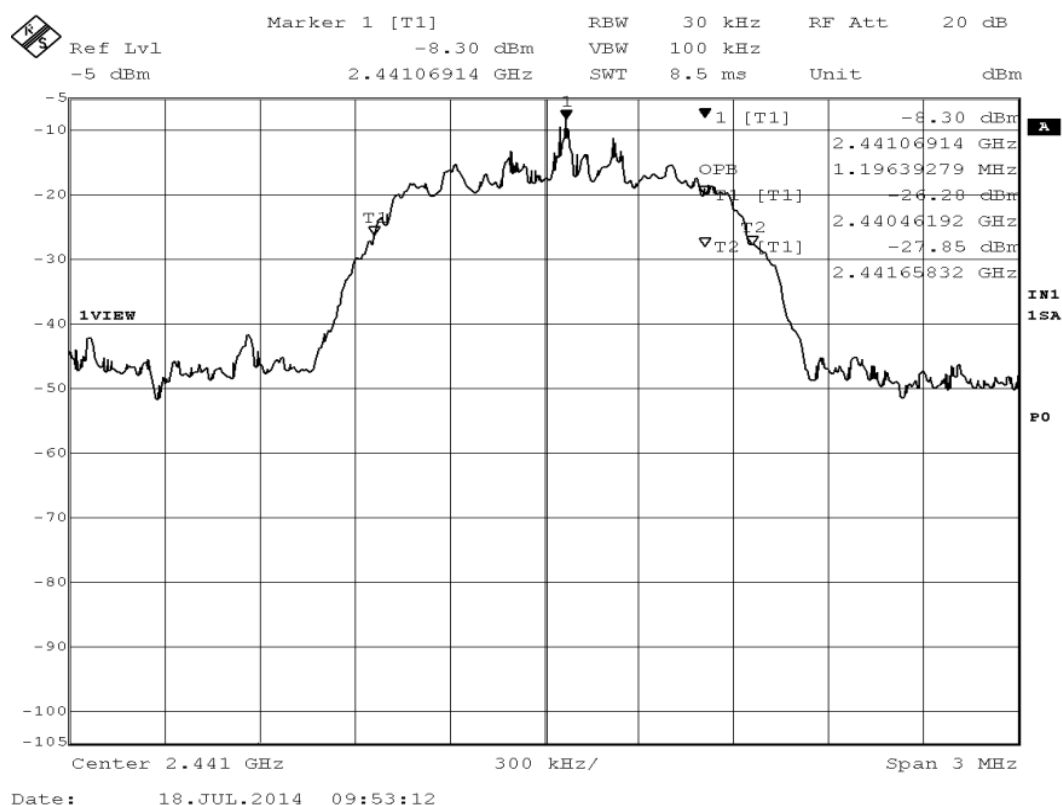
Middle Channel



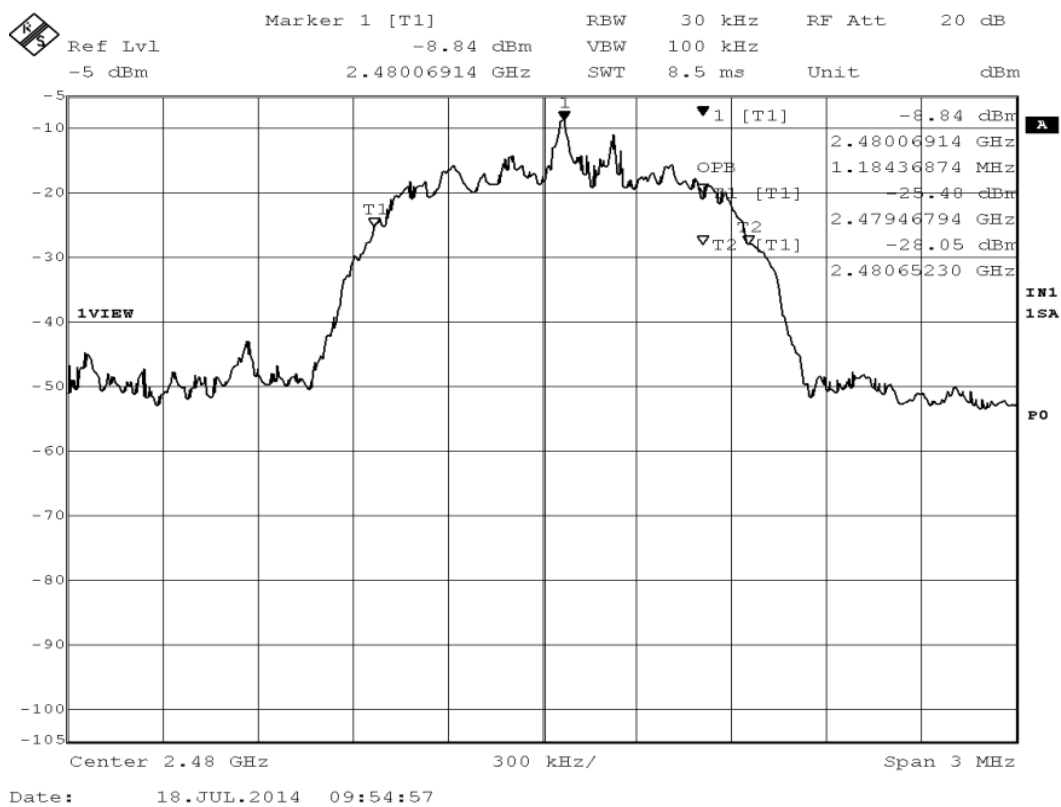
2)Packet Setting : 2DH5(Modulation type : pi/4-DQPSK)



Low Channel

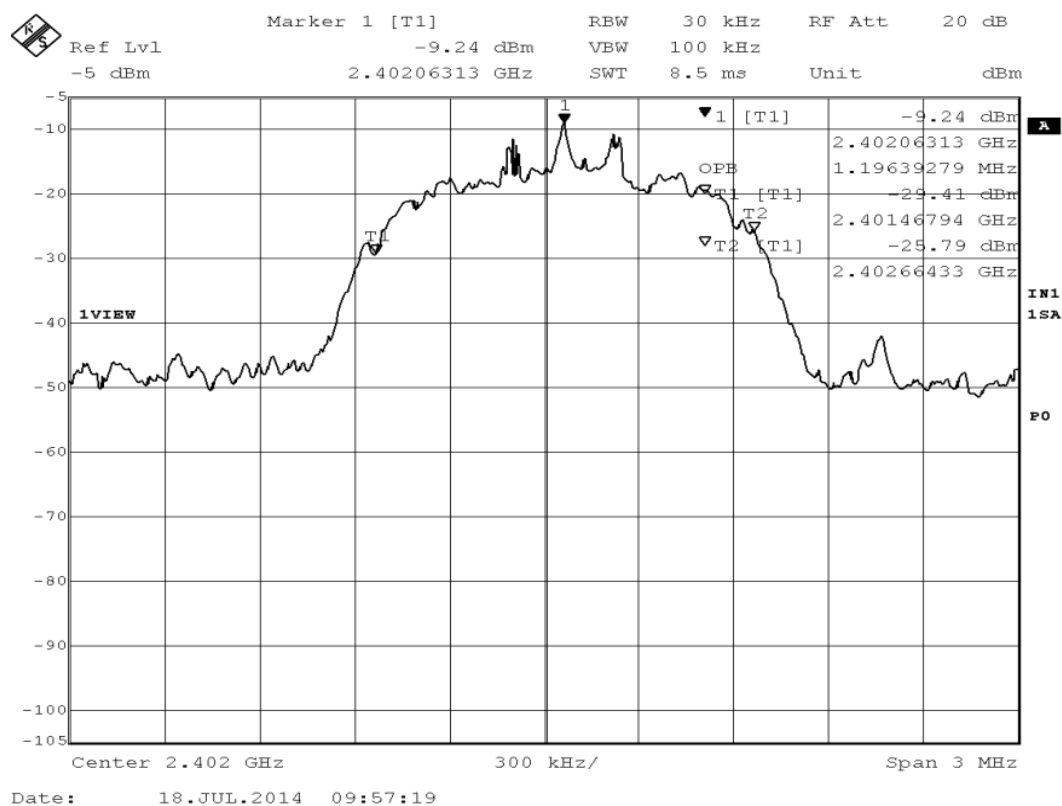


Middle Channel

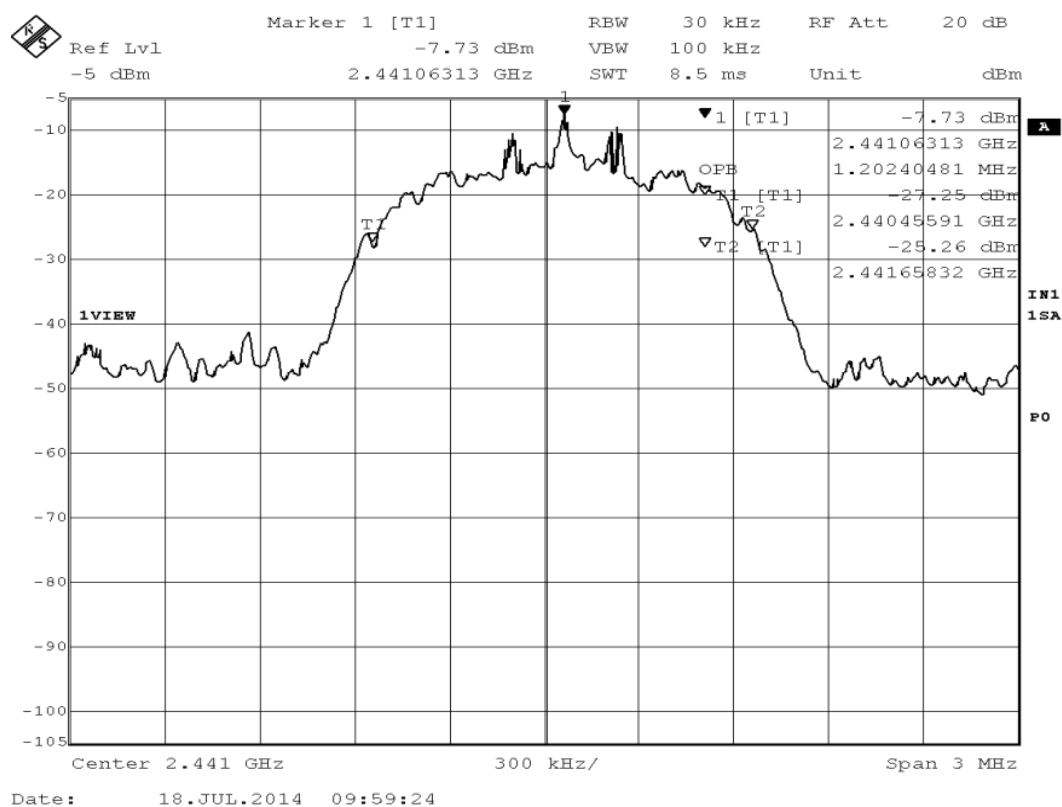


High Channel

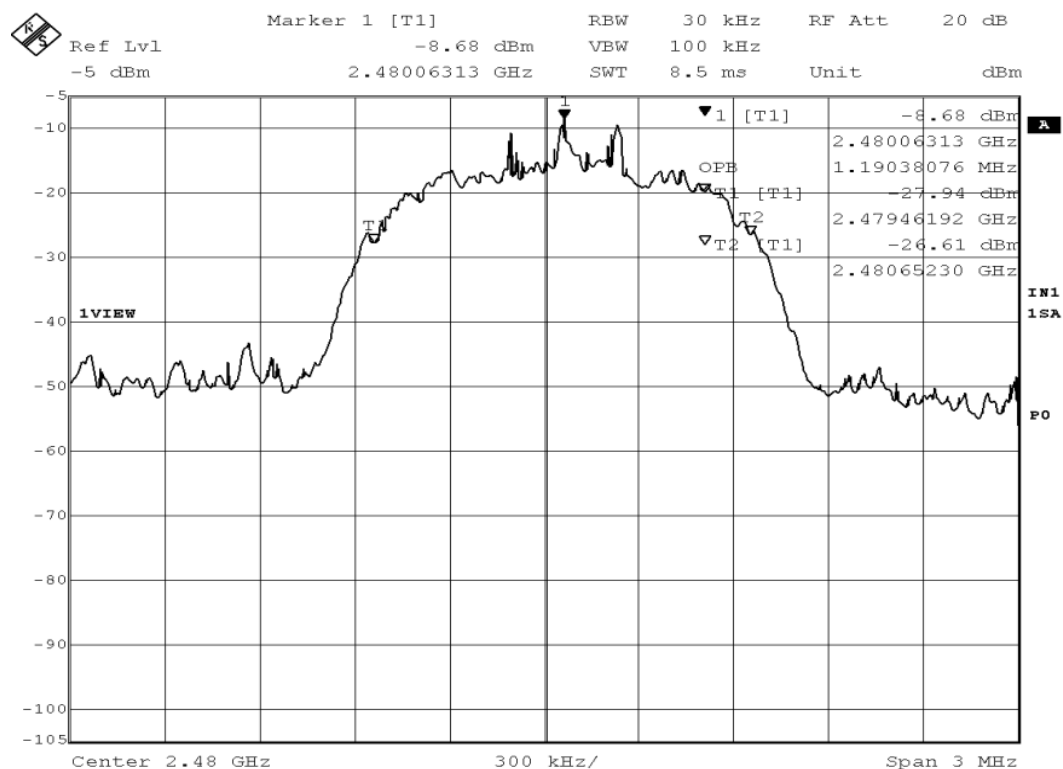
3)Packet Setting : 3 DH5(Modulation type : 8DPSK)



Low Channel



Middle Channel

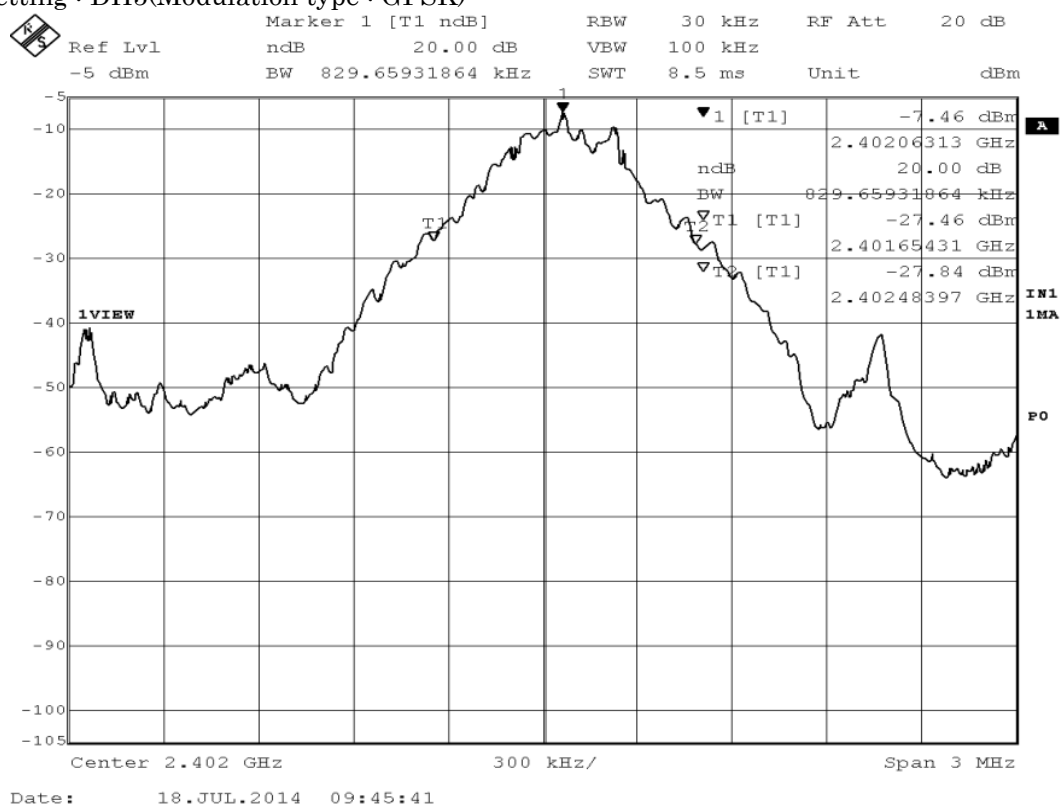


Date: 18.JUL.2014 10:01:05

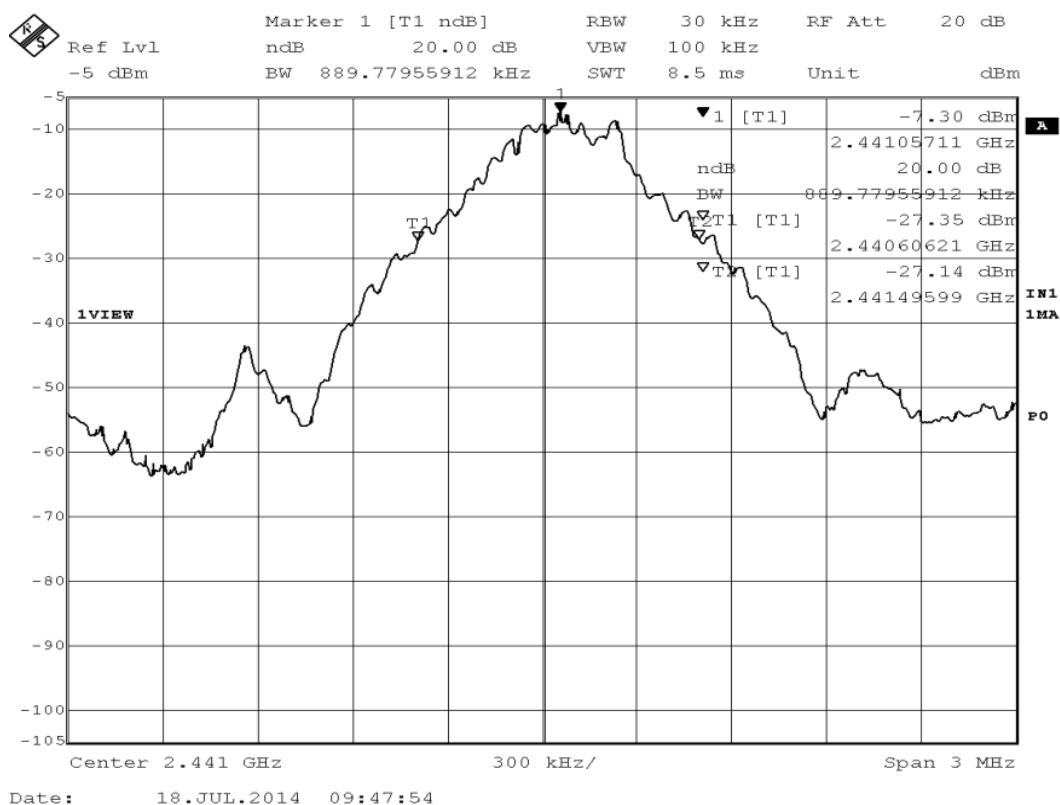
High Channel

7.3.4.2 -20dBc Bandwidth

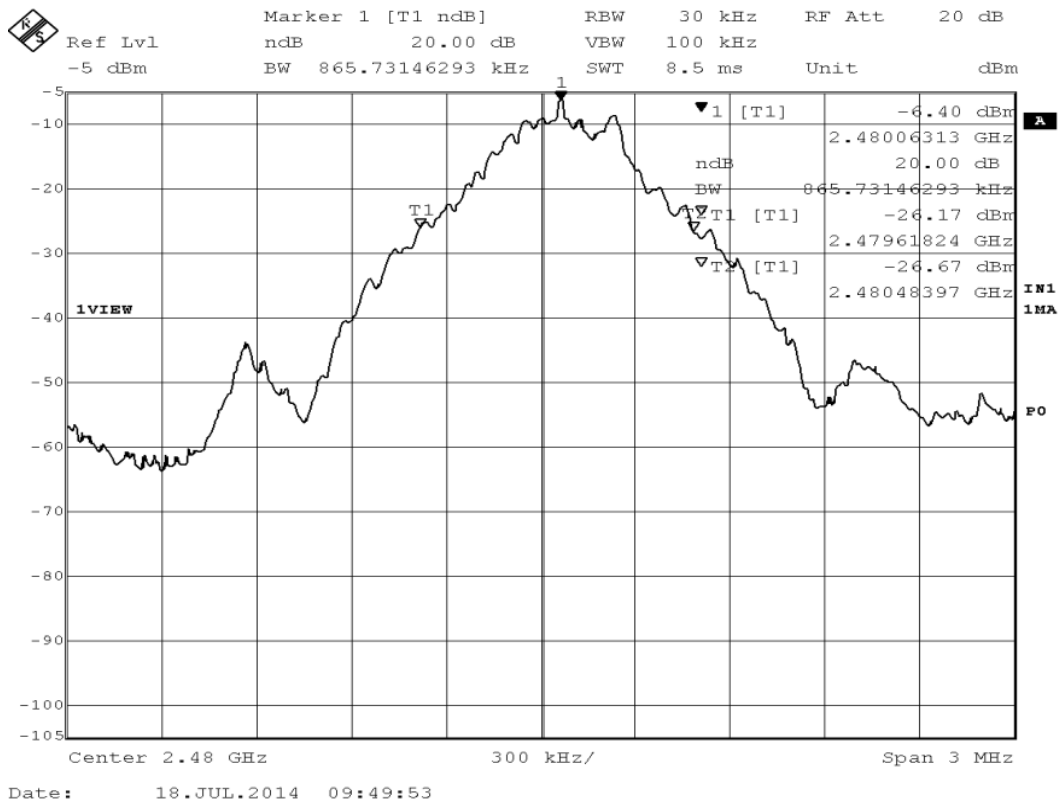
1) Packet Setting : DH5 (Modulation type : GFSK)



Low Channel

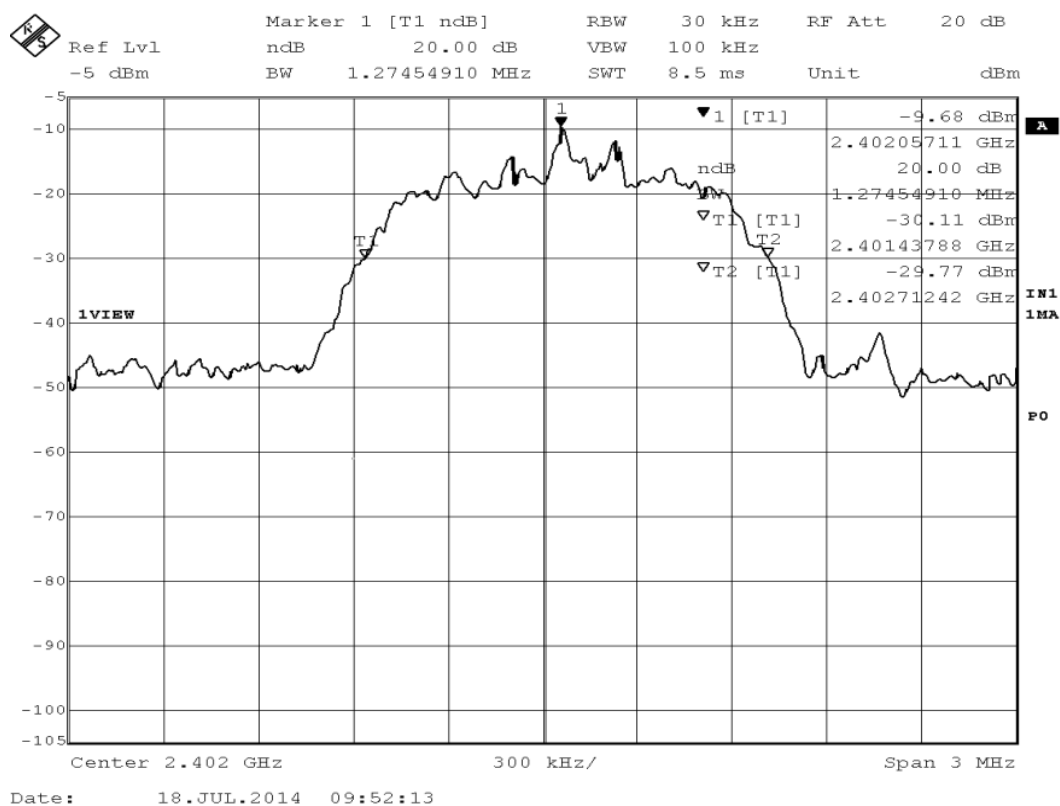


Middle Channel

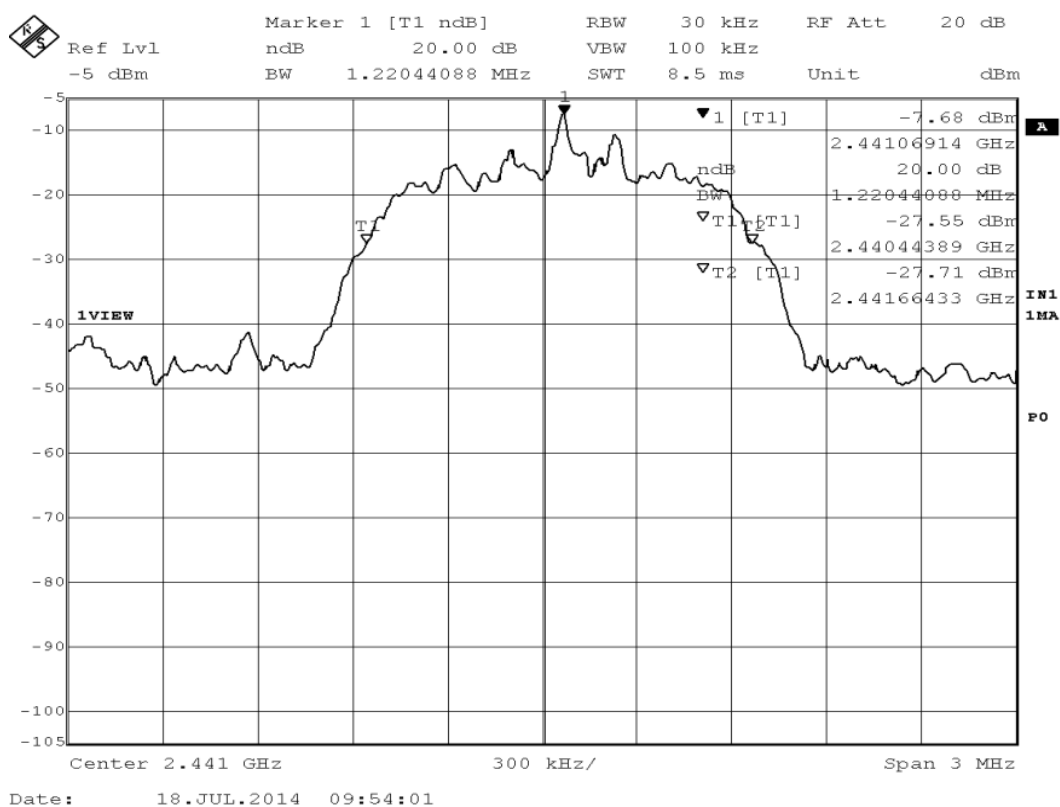


High Channel

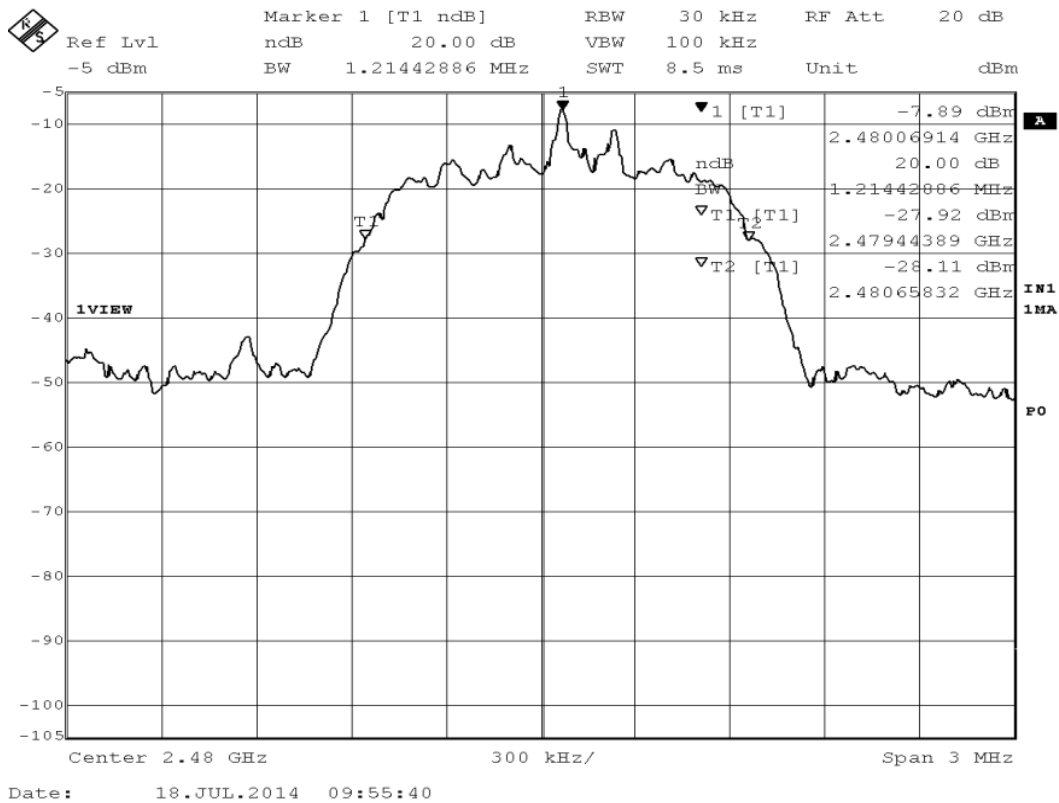
2)Packet Setting : 2DH5(Modulation type : pi/4-DQPSK)



Low Channel

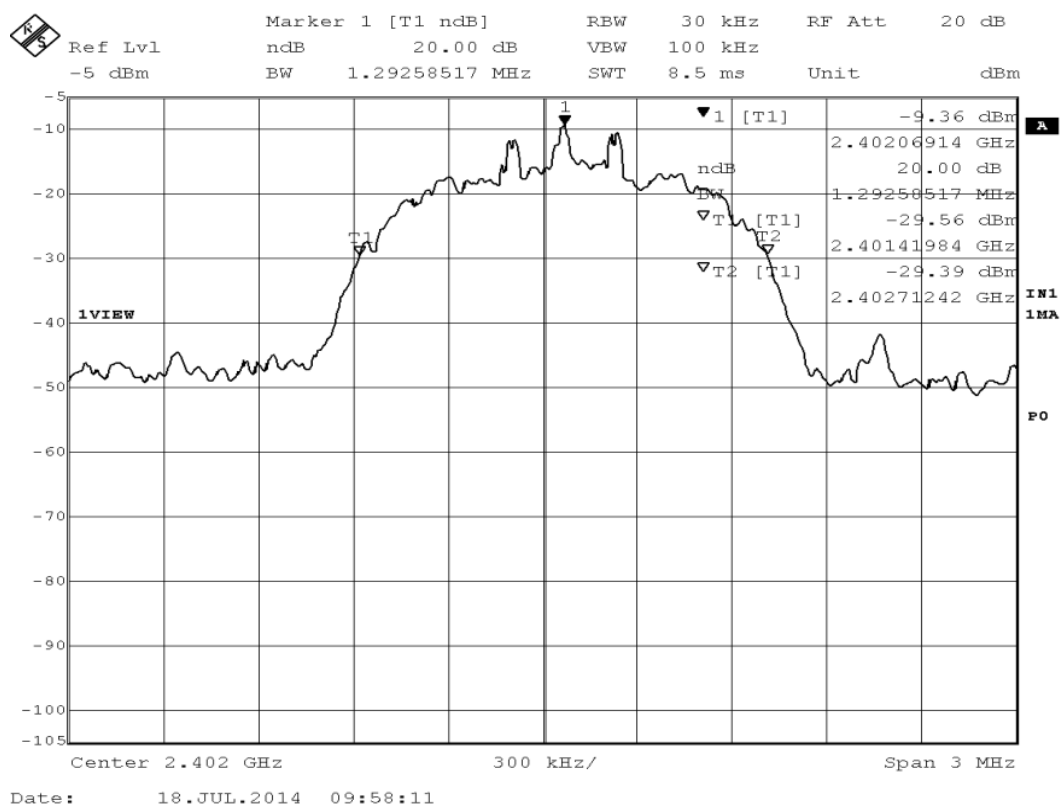


Middle Channel

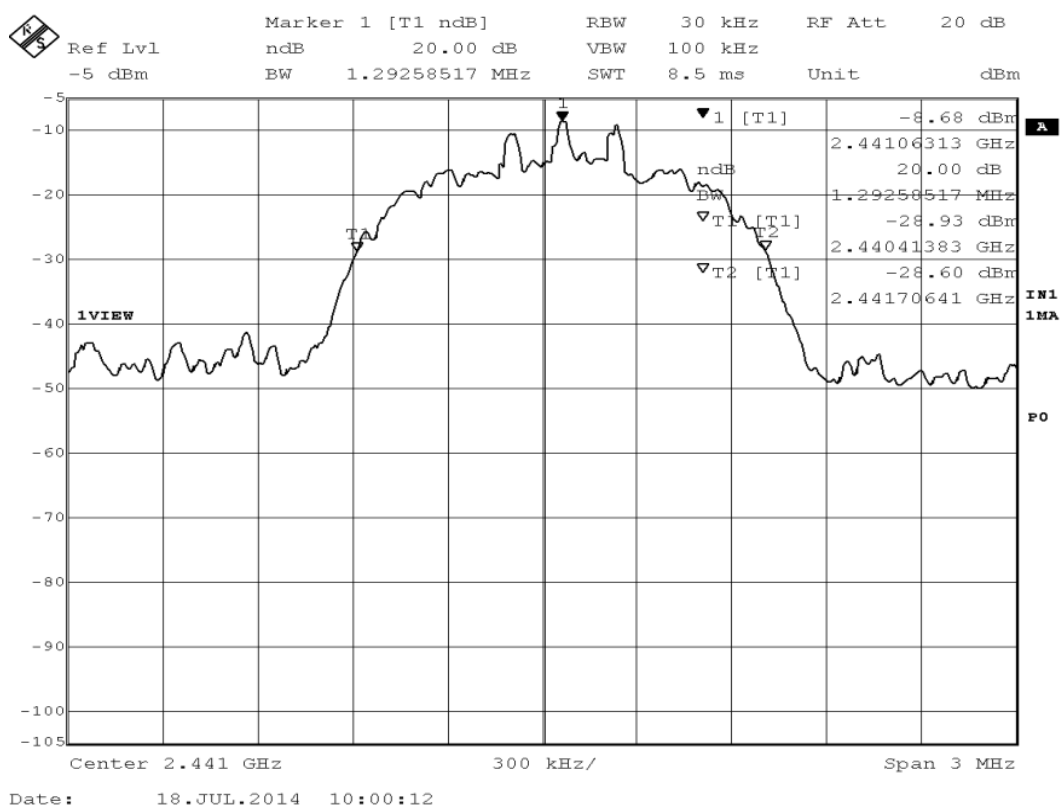


High Channel

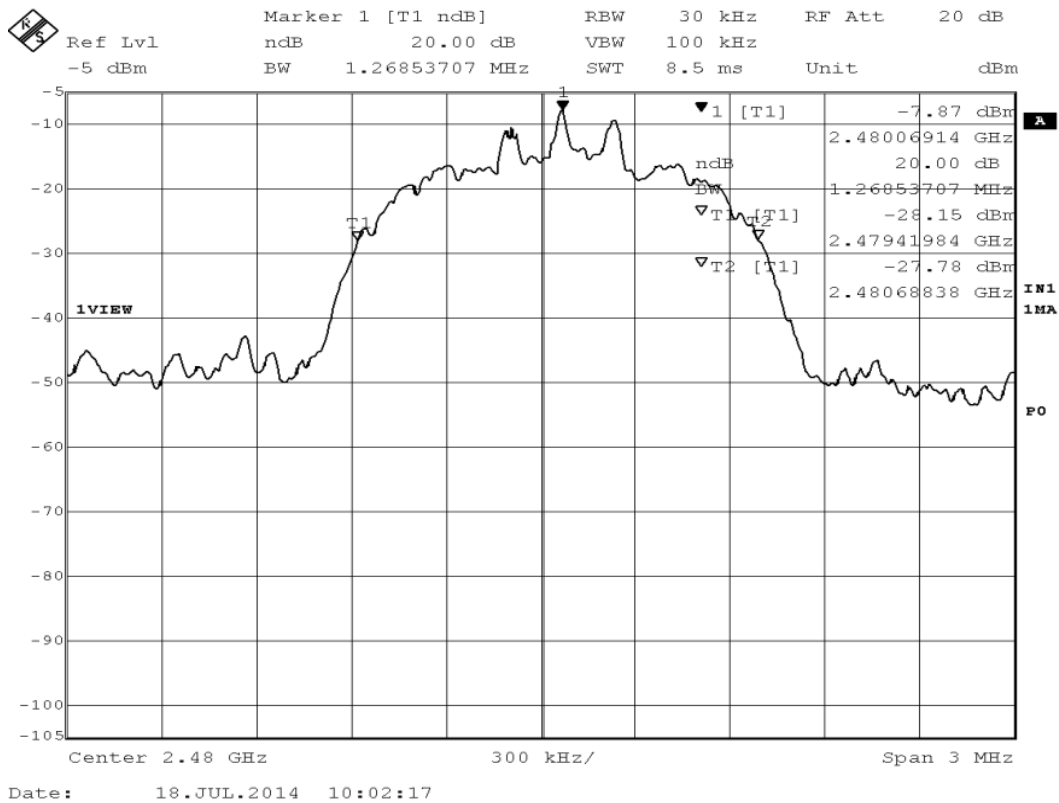
3)Packet Setting : 3 DH5(Modulation type : 8DPSK)



Low Channel



Middle Channel



High Channel

7.4 Dwell Time

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

For the limits, ☒ - Passed ☐ - Failed ☐ - Not judged

7.4.1 Worst Point and Measurement Uncertainty

Dwell Time is 309.0 msec
Dwell Time (Inquiry) is N/A msec
Dwell Time (AFH) is 310.1 msec

Uncertainty of Measurement Results +/-0.6 %(2σ)

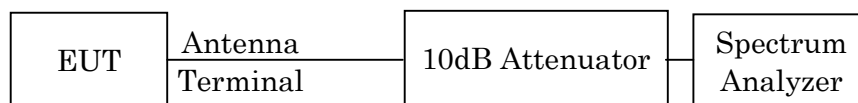
Remarks : _____

7.4.2 Test Site and Instruments

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Receiver	ESI26	Rohde & Schwarz	13	2014/6	1 Year
RF Cable	S 04272B	SUHNER	45	2014/5	1 Year
Attenuator	43KC-10	Anritsu	80	2013/10	1 Year

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

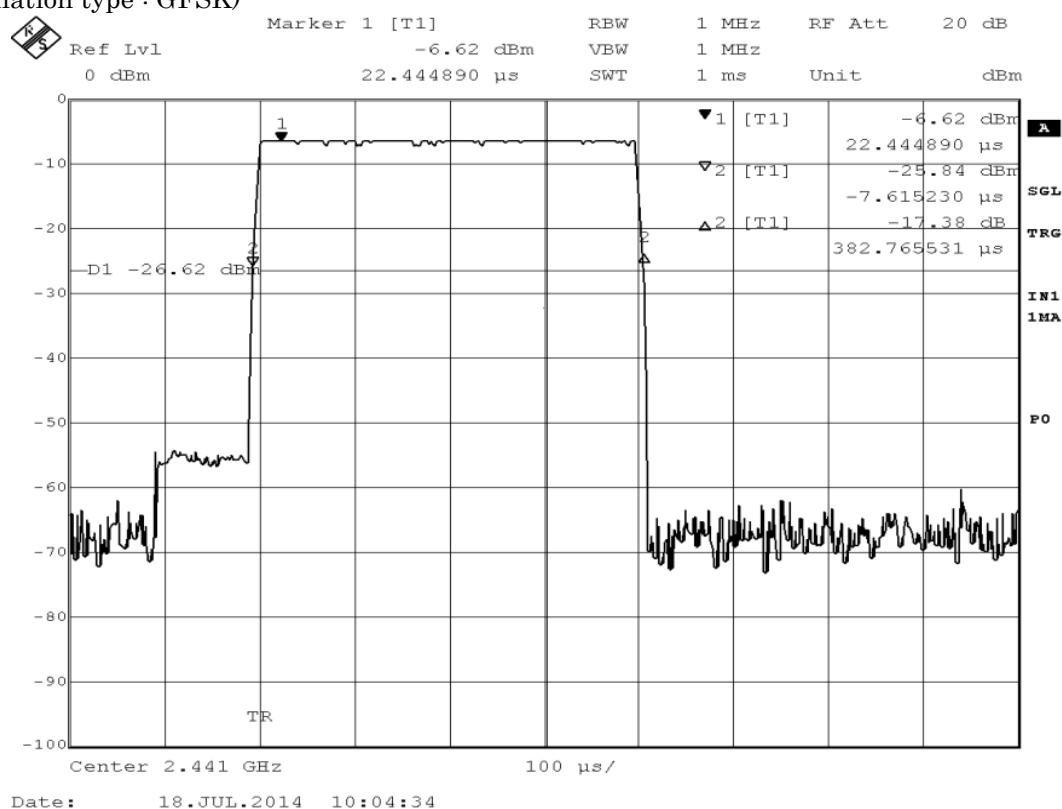
Test Date : July 18, 2014

Temp.:24°C, Humi:60%

Mode of EUT	Dwell Time (msec)	Limit (msec)
DH1	122.6	400
DH3	262.6	400
DH5	309.0	400
Inquiry	-	400

The EUT not have inquiry mode because it was Slave device.

DH1(Modulation type : GFSK)

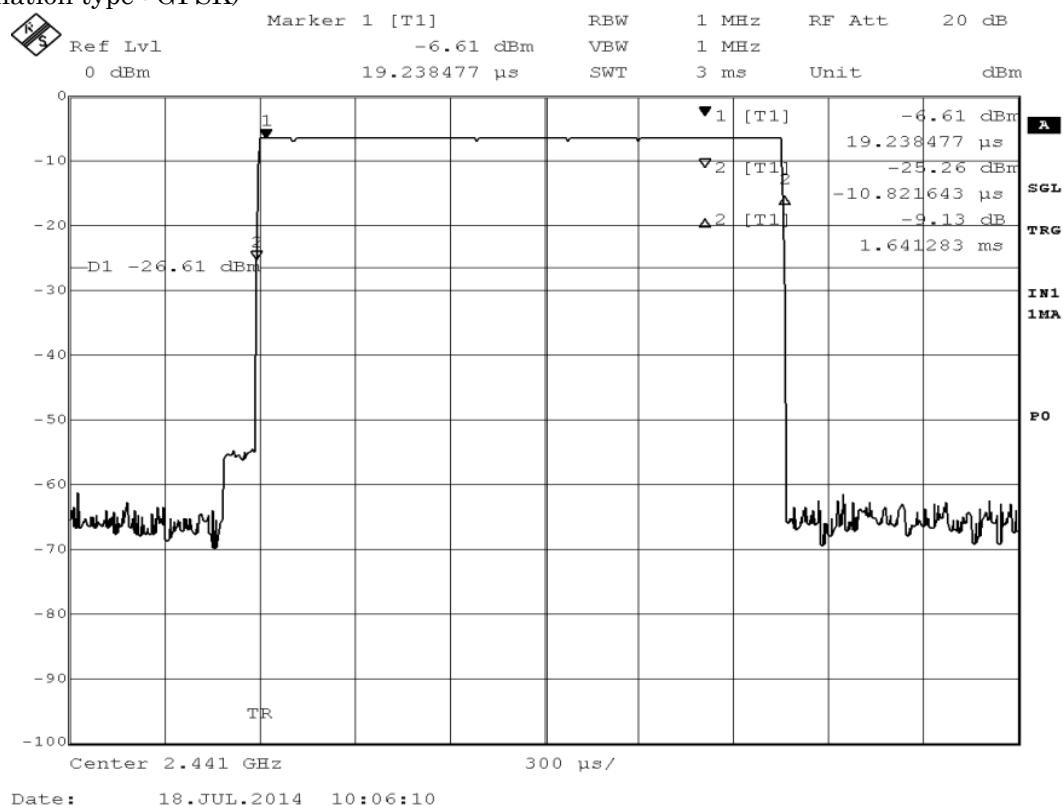


Note : The system makes worst case 1600 hops per second or 1 time slot has a length of 625 μs with 79 channels. A DH1 Packet need 1 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 800 hops per second with 79 channels. So the system has each channel 10.1266 times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

Each tx-time per appearance is 0.383 ms.

Dwell time = 320.0 * 0.383 = 122.6 ms

DH3(Modulation type : GFSK)

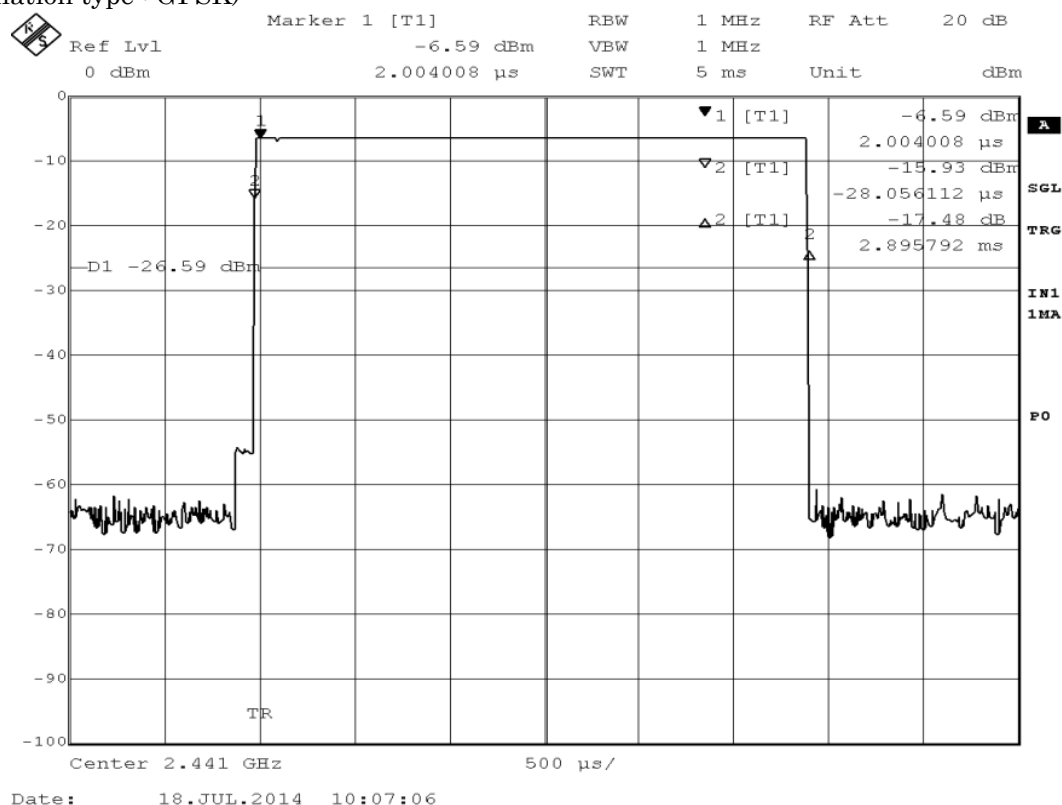


Note : A DH3 Packet need 3 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 400 hops per second with 79 channels. So the system have each channel 5.063 times per second and so for 31.6 seconds the system have 160.0 times of appearance.

Each tx-time per appearance is 1.641 ms.

Dwell time = 160.0 * 1.641 = 262.6 ms

DH5(Modulation type : GFSK)



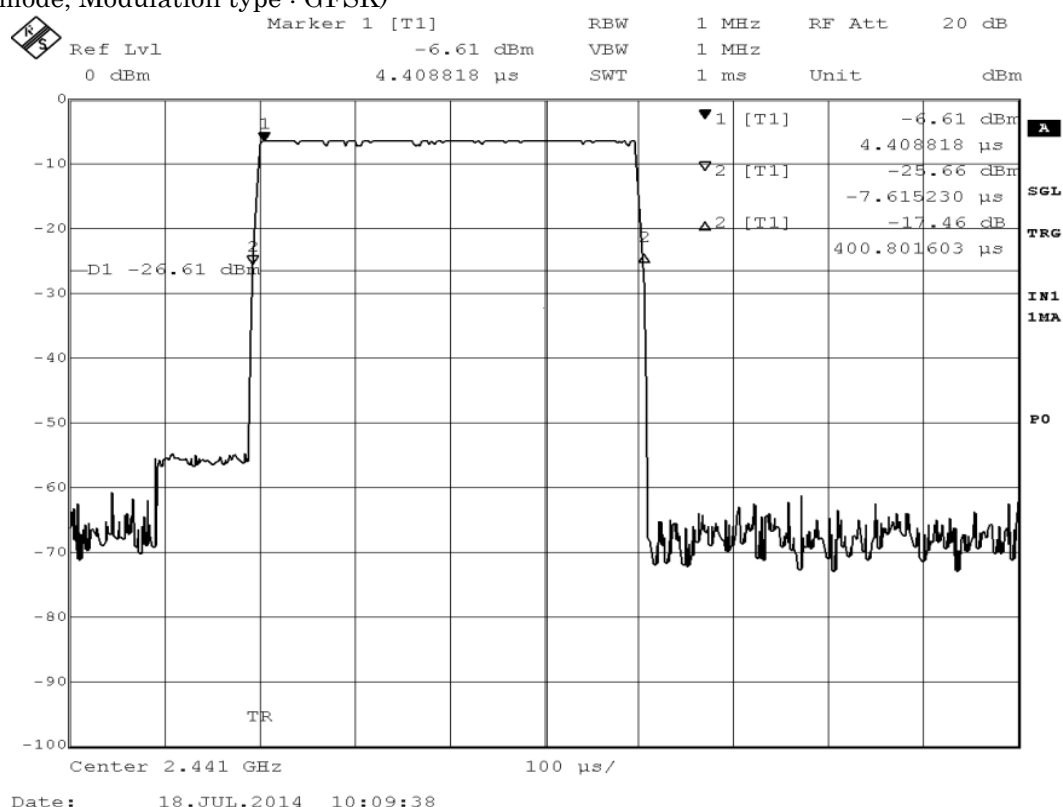
Note : A DH5 Packet need 5 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 266.667 hops per second with 79 channels. So the system have each channel 3.3755 times per second and so for 31.6 seconds the system have 106.7 times of appearance.

Each tx-time per appearance is 2.896 ms.

Dwell time = $106.7 * 2.896 = 309.0$ ms

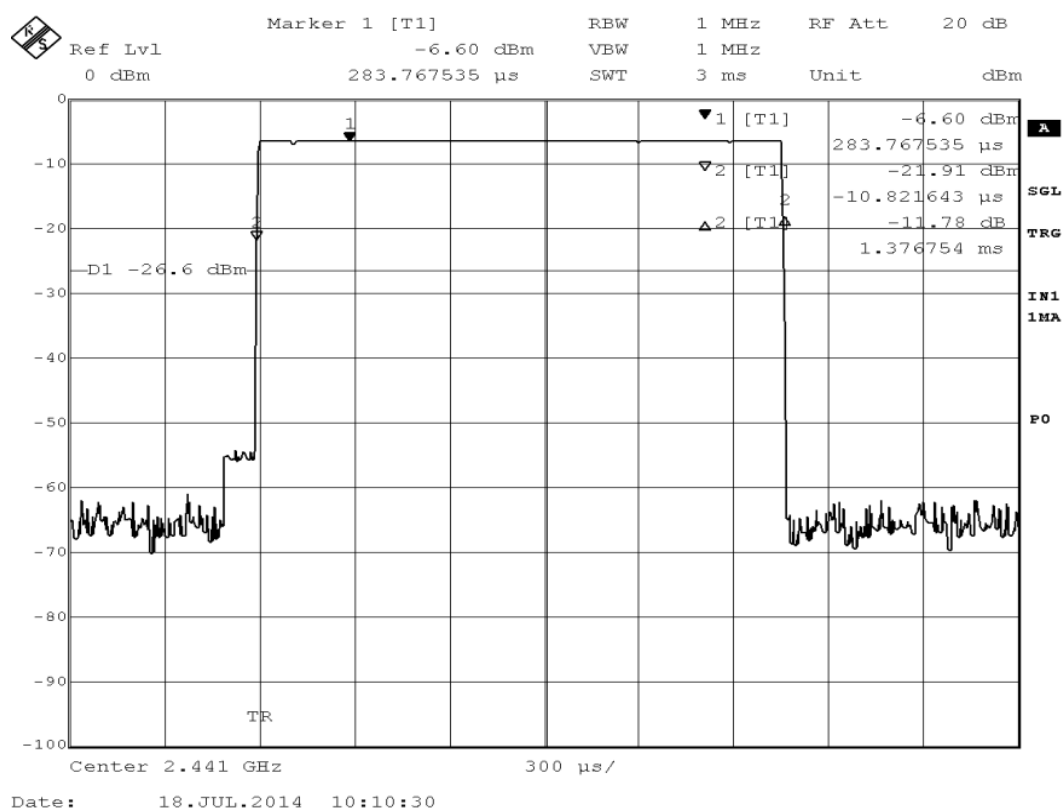
Mode of EUT	Dwell Time (msec)	Limit (msec)
DH1(AFH)	128.3	400
DH3(AFH)	220.3	400
DH5(AFH)	310.1	400

DH1(AFH mode, Modulation type : GFSK)



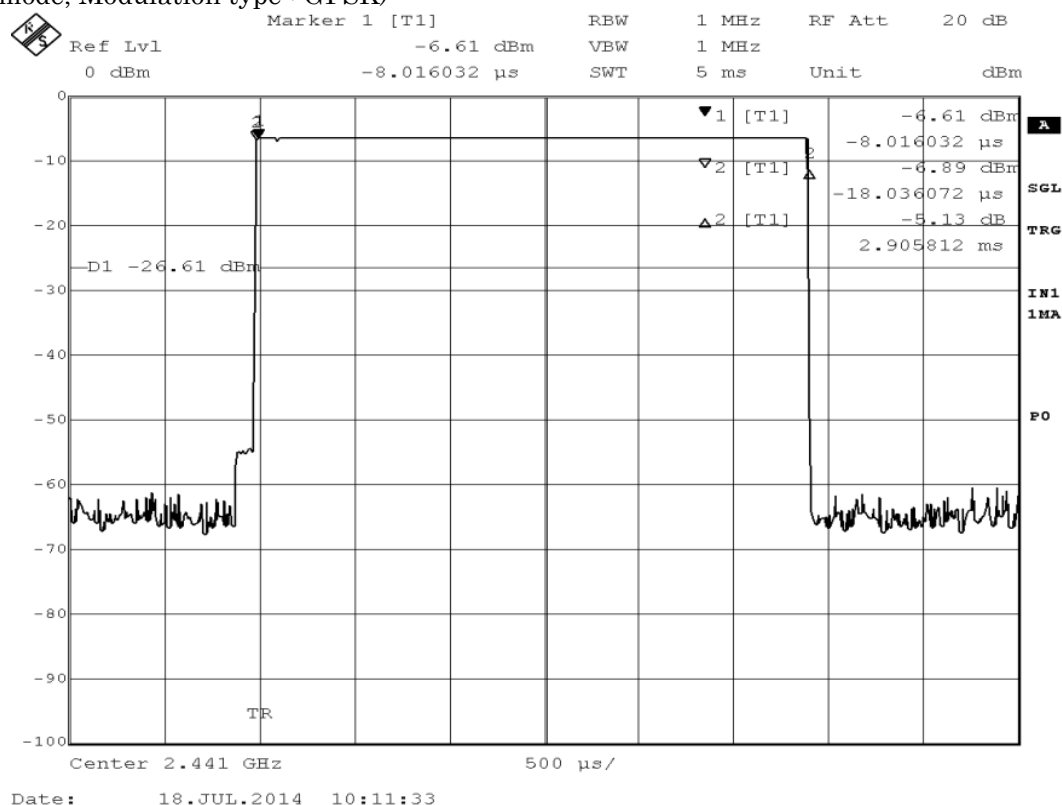
Note : The system makes worst case 1600 hops per second or 1 time slot has a length of 625 μs with 79 channels. A DH1 Packet need 1 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 800 hops per second with 20 channels. So the system has each channel 40 times per second and so for 8 seconds the system have 320.0 times of appearance.
 Each tx-time per appearance is 0.401 ms.
 Dwell time = 320.0 * 0.401 = 128.3 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 400 hops per second with 20 channels. So the system have 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 1.377 ms.
Dwell time = 160.0 * 1.377 = 220.3 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 266.667 hops per second with 20 channels. So the system have each channel 13.33335 times per second and so for 8 seconds the system have 106.7 times of appearance.

Each tx-time per appearance is 2.906 ms.

Dwell time = $106.7 \times 2.906 = 310.1\text{ms}$

7.5 Peak Output Power(Conduction)

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

For the limits, ☒ - Passed ☐ - Failed ☐ - Not judged

7.5.1 Worst Point and Measurement Uncertainty

Peak Output Power is _____ 4.90 _____ dBm at _____ 2480.0 _____ MHz

Uncertainty of Measurement Results at Amplitude _____ +/-0.8 _____ dB(2 σ)

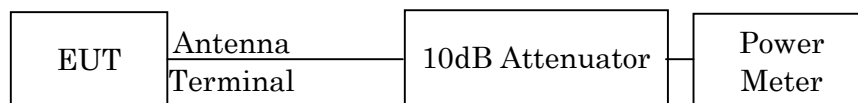
Remarks : _____

7.5.2 Test Site and Instruments

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Power Meter	ML2495A	Anritsu	210	2013/12	1 Year
Power Sensor	MA2491A	Anritsu	211	2013/12	1 Year
RF Cable	S 04272B	SUHNER	45	2014/5	1 Year
Attenuator	43KC-10	Anritsu	80	2013/10	1 Year

7.5.3 Test Method and Test Setup (Diagrammatic illustration)

The Conducted RF Power Output was measured with a power meter, one 10dB attenuator and a short, low loss cable.



7.5.4 Test Data

Date : July 18, 2014

Temp. : 25 °C

Humi. : 60 %

1)DH5(Modulation type : GFSK)

Trasnmitting	Correction	Meter	Conducted	Limits	Margin
Frequency	Factor	Reading	Peak Output Power		
CH (MHz)	(dB)	(dBm)	(dBm) (mW)	(dBm)	(dB)
00 2402.0	11.42	-7.61	3.81 2.40	20.97	17.16
39 2441.0	11.42	-6.54	4.88 3.07	20.97	16.09
78 2480.0	11.42	-6.52	4.90 3.09	20.97	16.07

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

Trasnmitting	Correction	Meter	Conducted	Limits	Margin
Frequency	Factor	Reading	Peak Output Power		
CH (MHz)	(dB)	(dBm)	(dBm) (mW)	(dBm)	(dB)
00 2402.0	11.42	-8.45	2.97 1.98	20.97	18.00
39 2441.0	11.42	-7.32	4.10 2.57	20.97	16.87
78 2480.0	11.42	-7.54	3.88 2.45	20.97	17.09

3)3DH5(Modulation type : 8DPSK)

Trasnmitting	Correction	Meter	Conducted	Limits	Margin
Frequency	Factor	Reading	Peak Output Power		
CH (MHz)	(dB)	(dBm)	(dBm) (mW)	(dBm)	(dB)
00 2402.0	11.42	-8.27	3.15 2.07	20.97	17.82
39 2441.0	11.42	-7.18	4.24 2.66	20.97	16.73
78 2480.0	11.42	-7.31	4.11 2.58	20.97	16.86

Calculated result at DF5 2480 MHz, as the worst point shown on underline:

Correction Factor	=	11.42	dB	
+) Meter Reading	=	-6.52	dBm	
Result	=	4.90	dBm	= 3.09 mW

Minimum Margin: 20.97 - 4.90 = 16.07 (dB)

NOTES

- The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.
- Was varied in the range of 85-115% of the input voltage, but there was no change in measured value.
- 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

7.7 Spurious Emissions(Conduction)

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

☐ - Not Applicable

For the limits, ☒ - Passed ☐ - Failed ☐ - Not judged

7.7.1 Worst Point and Measurement Uncertainty

Uncertainty of Measurement Results

9 kHz – 1GHz	<u>+/-1.0</u>	dB(2 σ)
1GHz – 18GHz	<u>+/-1.2</u>	dB(2 σ)
18GHz – 40GHz	<u>+/-1.6</u>	dB(2 σ)

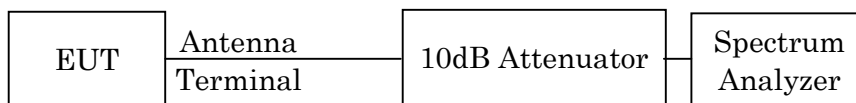
Remarks : Measurement result is within the range of measurement uncertainty.

7.7.2 Test Site and Instruments

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Receiver	ESI26	Rohde & Schwarz	13	2014/6	1 Year
RF Cable	S 04272B	SUHNER	45	2014/5	1 Year
Attenuator	43KC-10	Anritsu	80	2013/10	1 Year

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

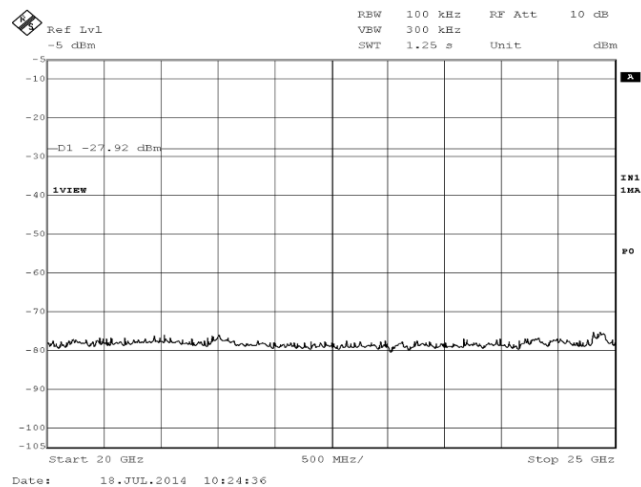
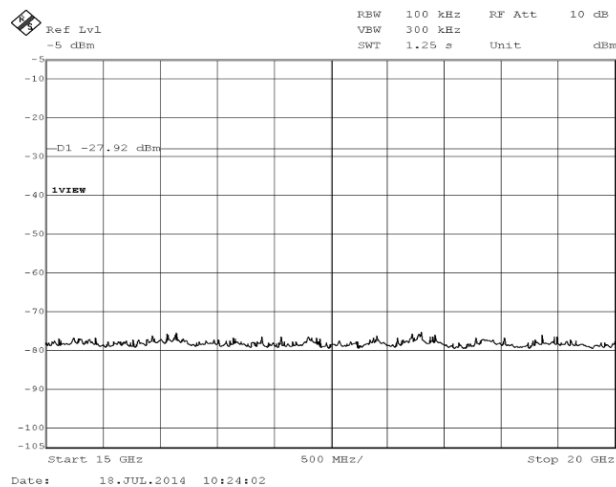
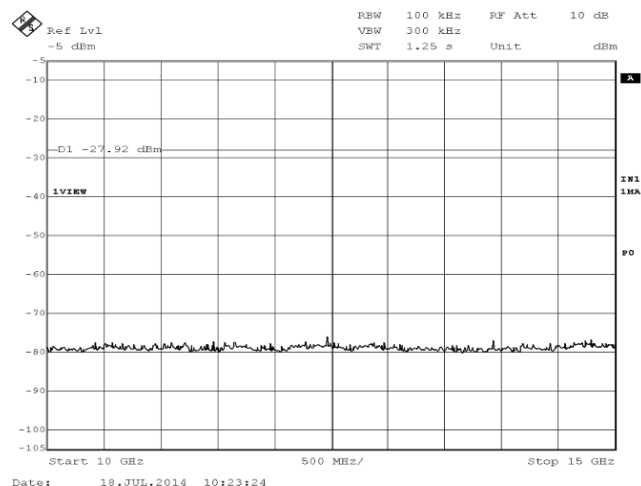
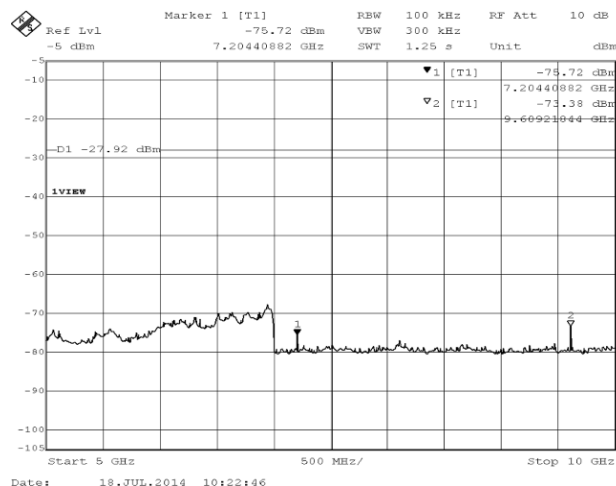
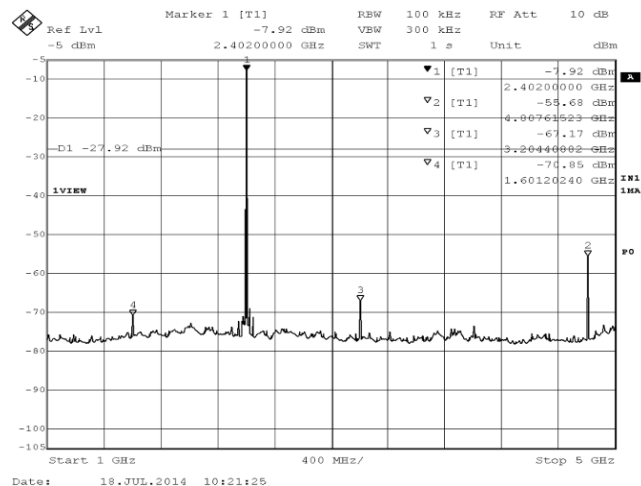
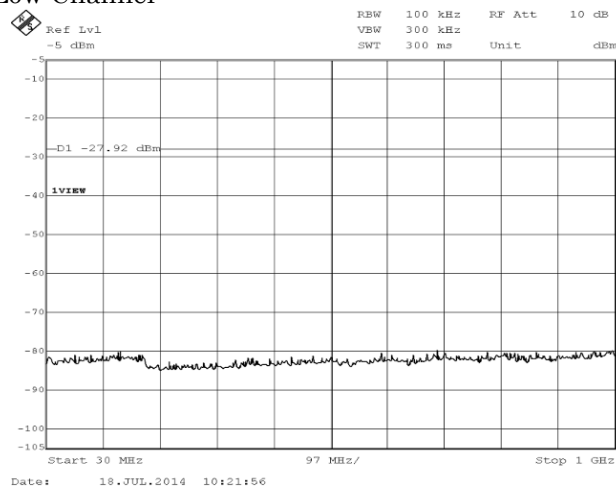
7.7.4 Test Data

Test Date : July 18, 2014

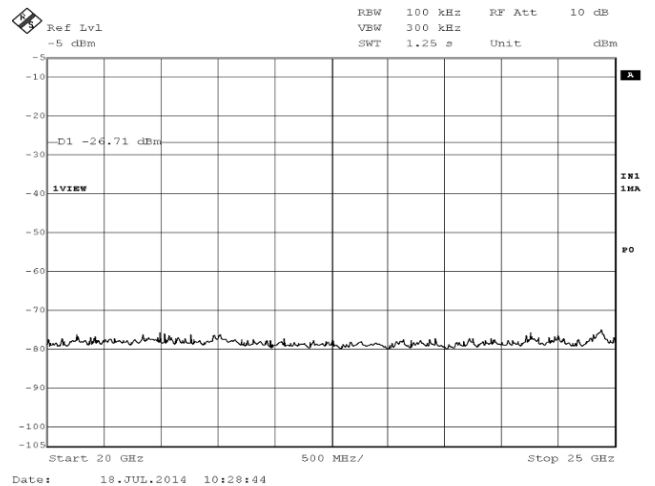
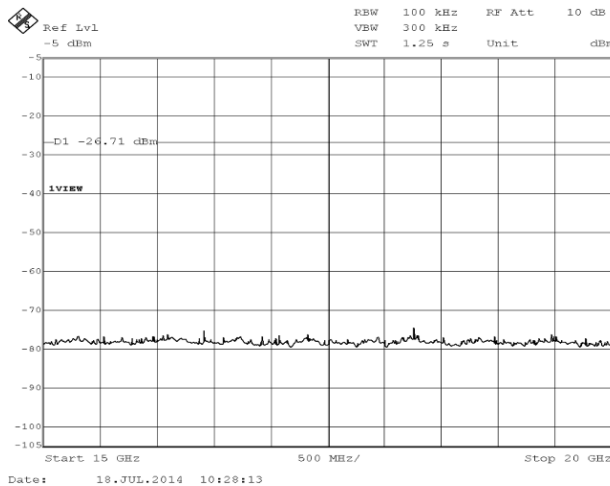
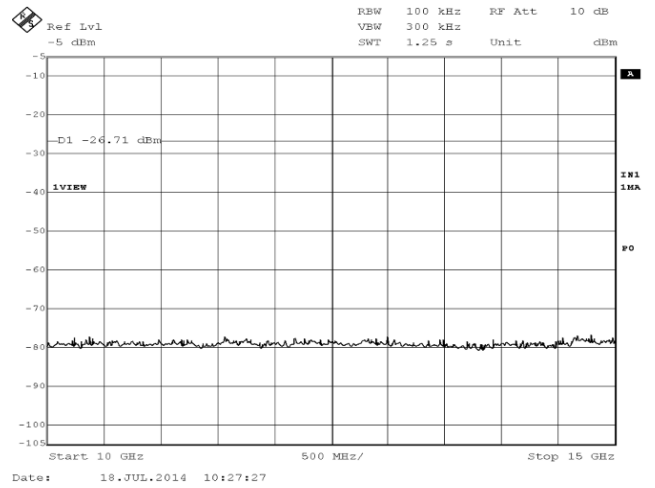
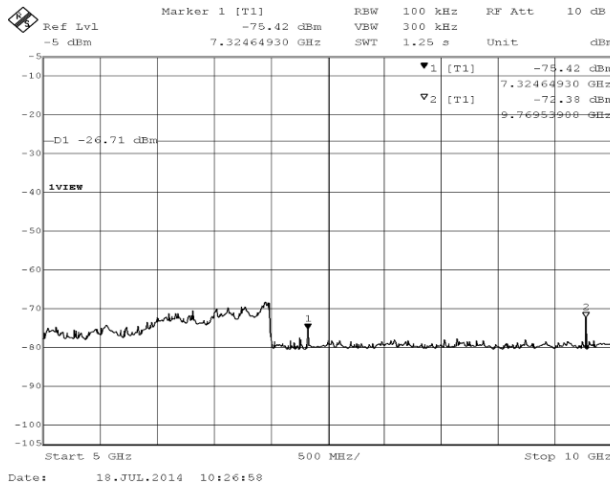
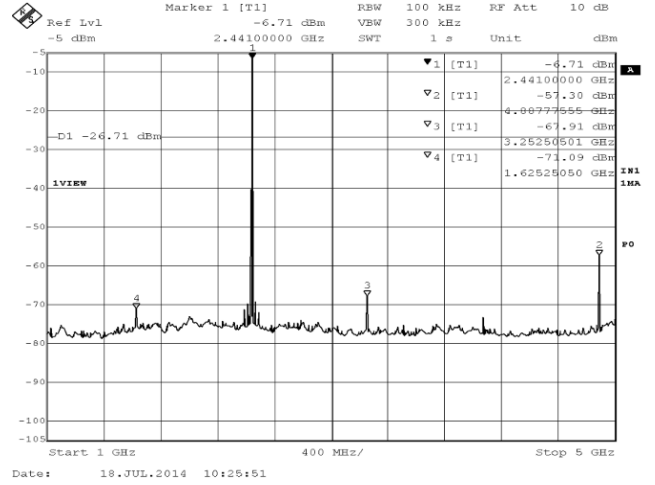
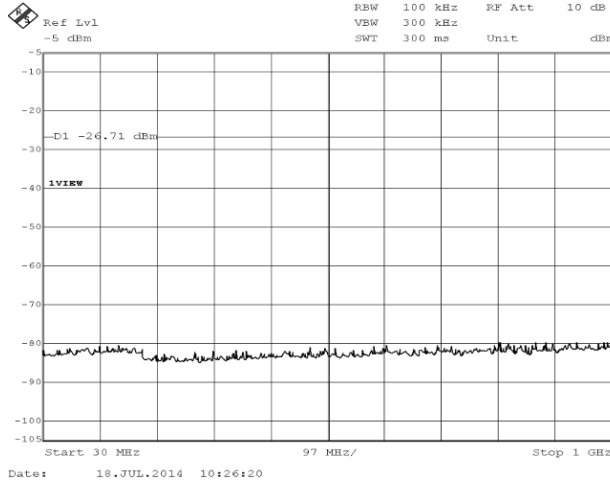
Temp.:24°C, Humi:60%

Mode of EUT : BDR (worst case)

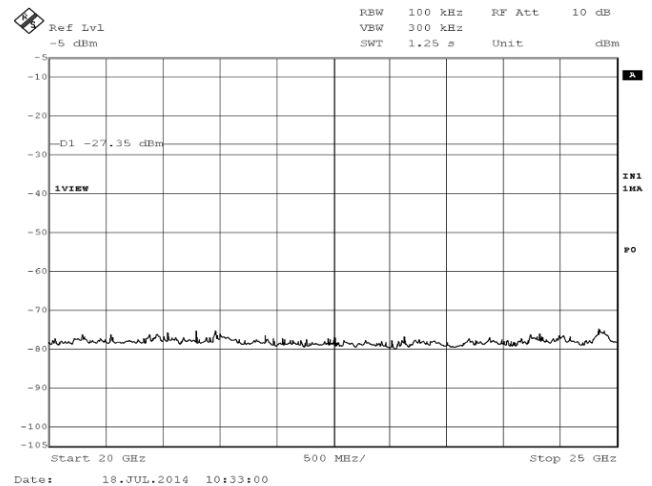
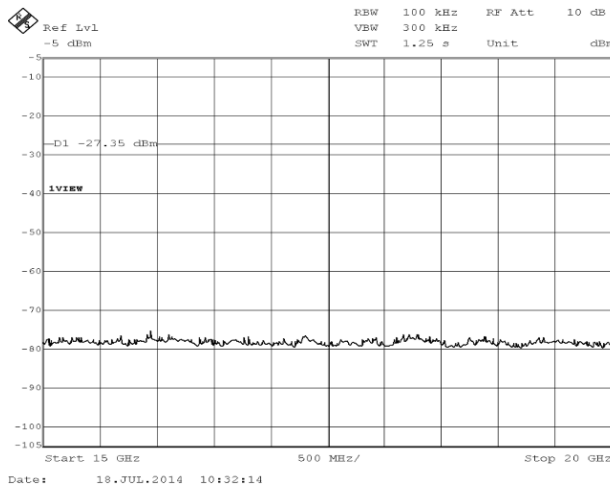
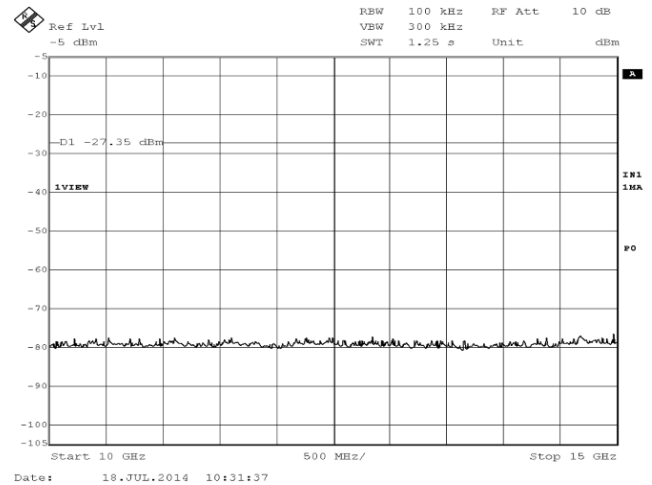
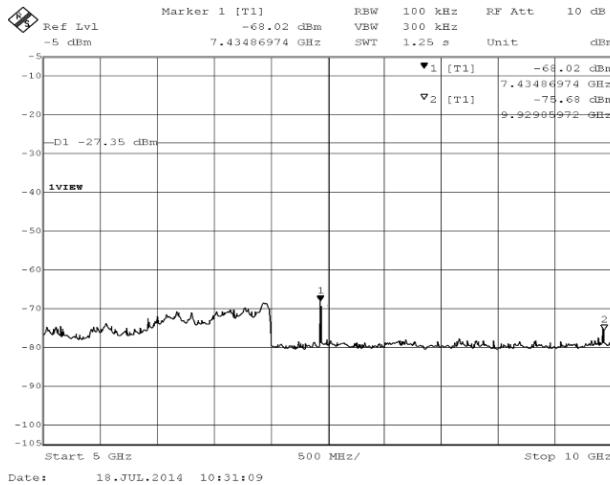
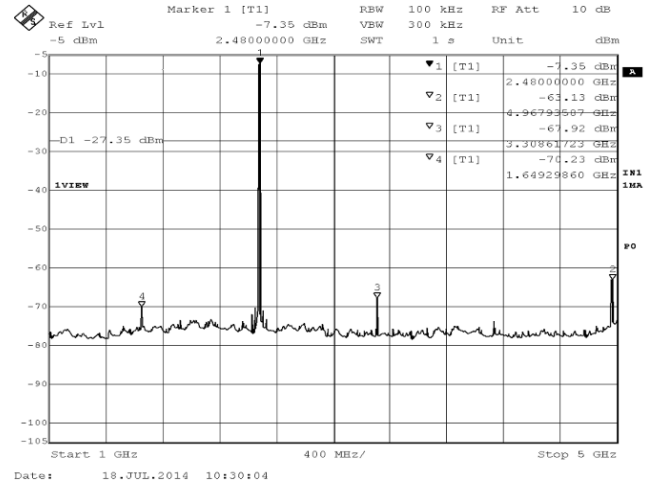
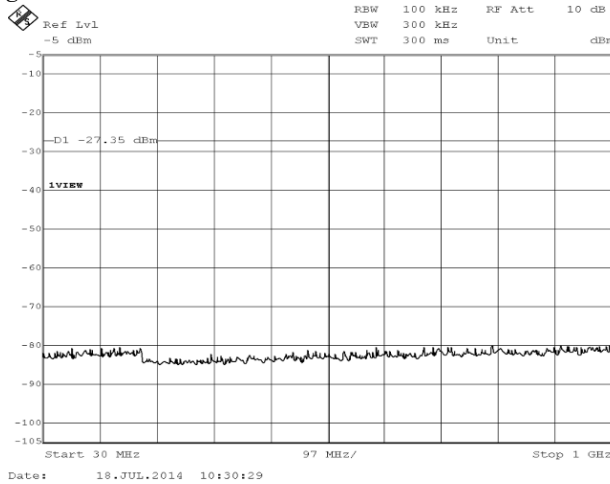
Low Channel



Middle Channel

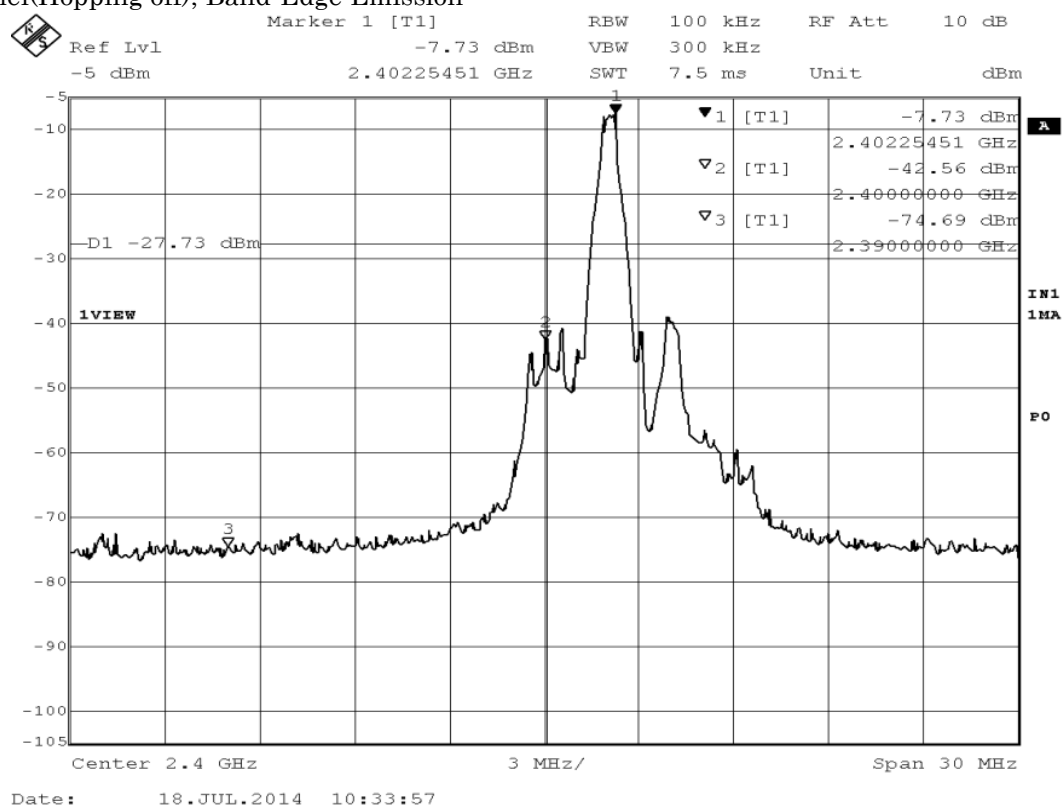


High Channel

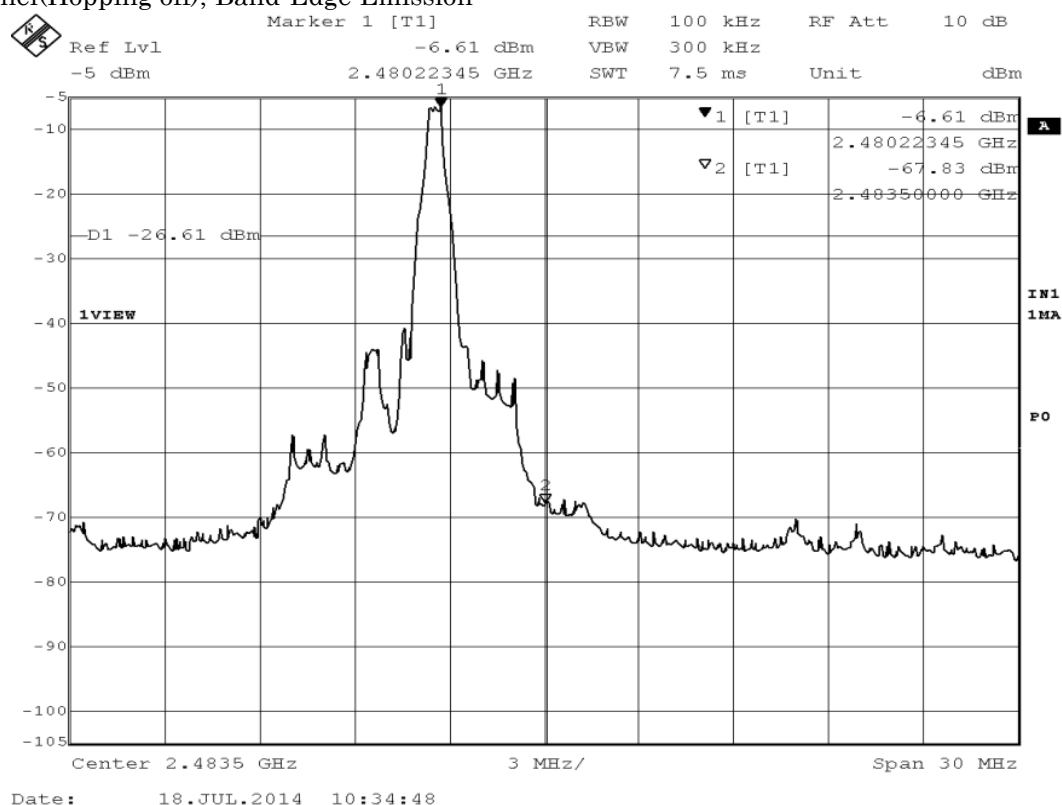


Band-Edge Emission

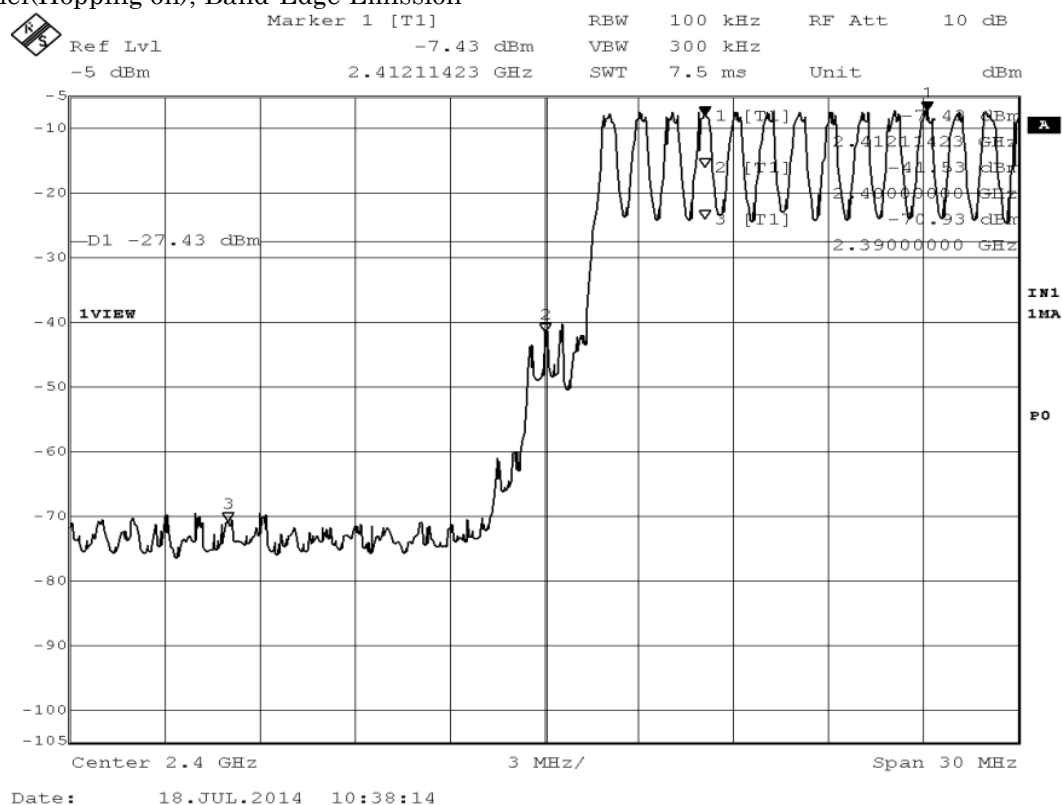
Low Channel(Hopping off), Band-Edge Emission



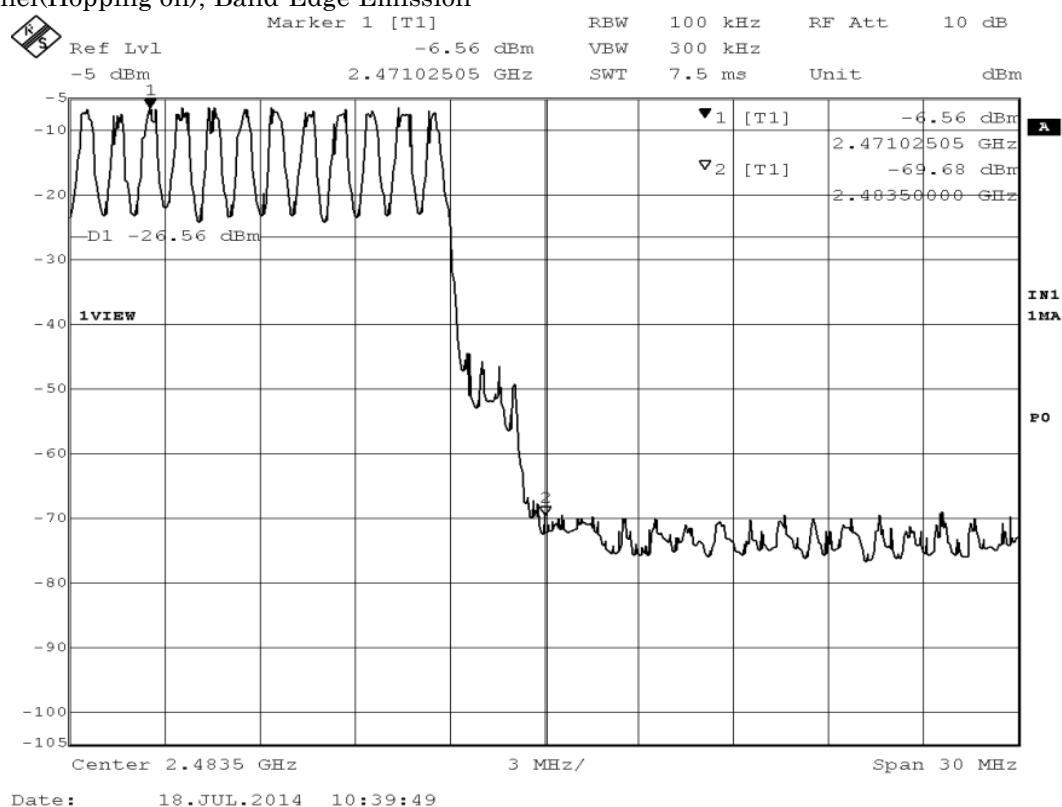
High Channel(Hopping off), Band-Edge Emission



Low Channel(Hopping on), Band-Edge Emission



High Channel(Hopping on), Band-Edge Emission



7.8 AC Powerline Conducted Emission

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

For the limits, ☒ - Passed ☐ - Failed ☐ - Not judged

7.8.1 Worst Point and Measurement Uncertainty

Min. Limit Margin (Quasi-Peak) 15.8 dB at 0.20 MHz

Uncertainty of Measurement Results +/-2.9 dB(2 σ)

Remarks : Min Limit Margin : Host DP-250

7.8.2 Test Site and Instruments

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Shield Room A	-	TDK	3	-	-
Receiver	ESCI	Rohde & Schwarz	172	2013/11	1 Year
RF Cable	RG223/U	SUHNER	42	2014/04	1 Year
LISN	KNW-407	Kyoritsu	34	2013/09	1 Year
HiPass Filter	KFL-009	Kyoritsu	246	2014/04	1 Year

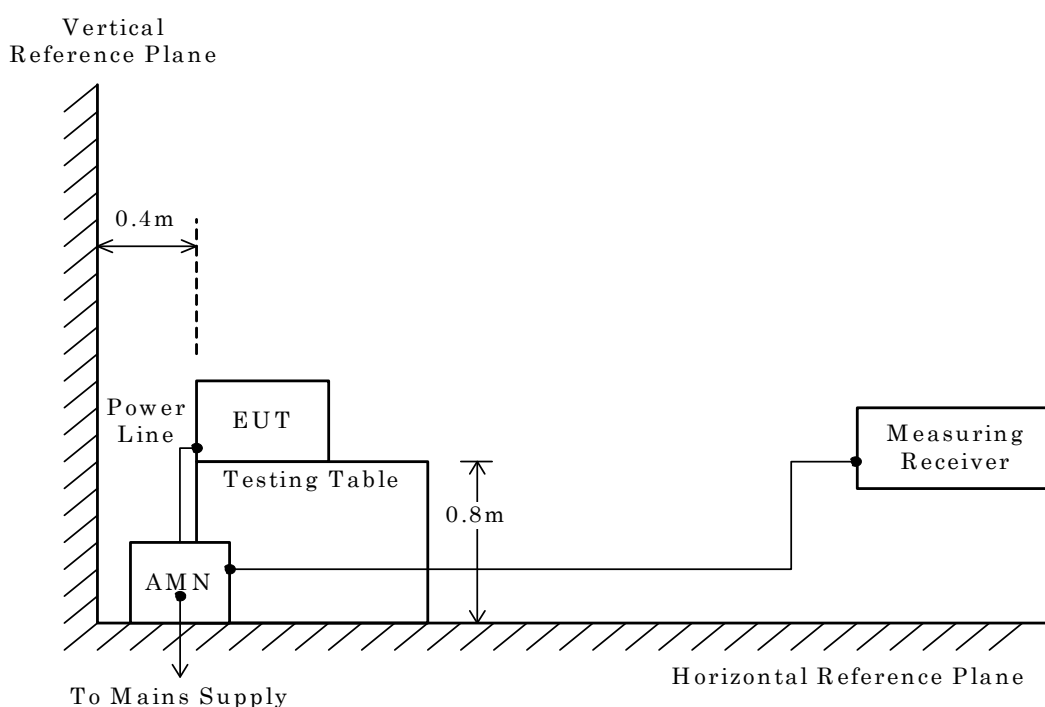
7.8.3 Test Method and Test Setup (Diagrammatic illustration)

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

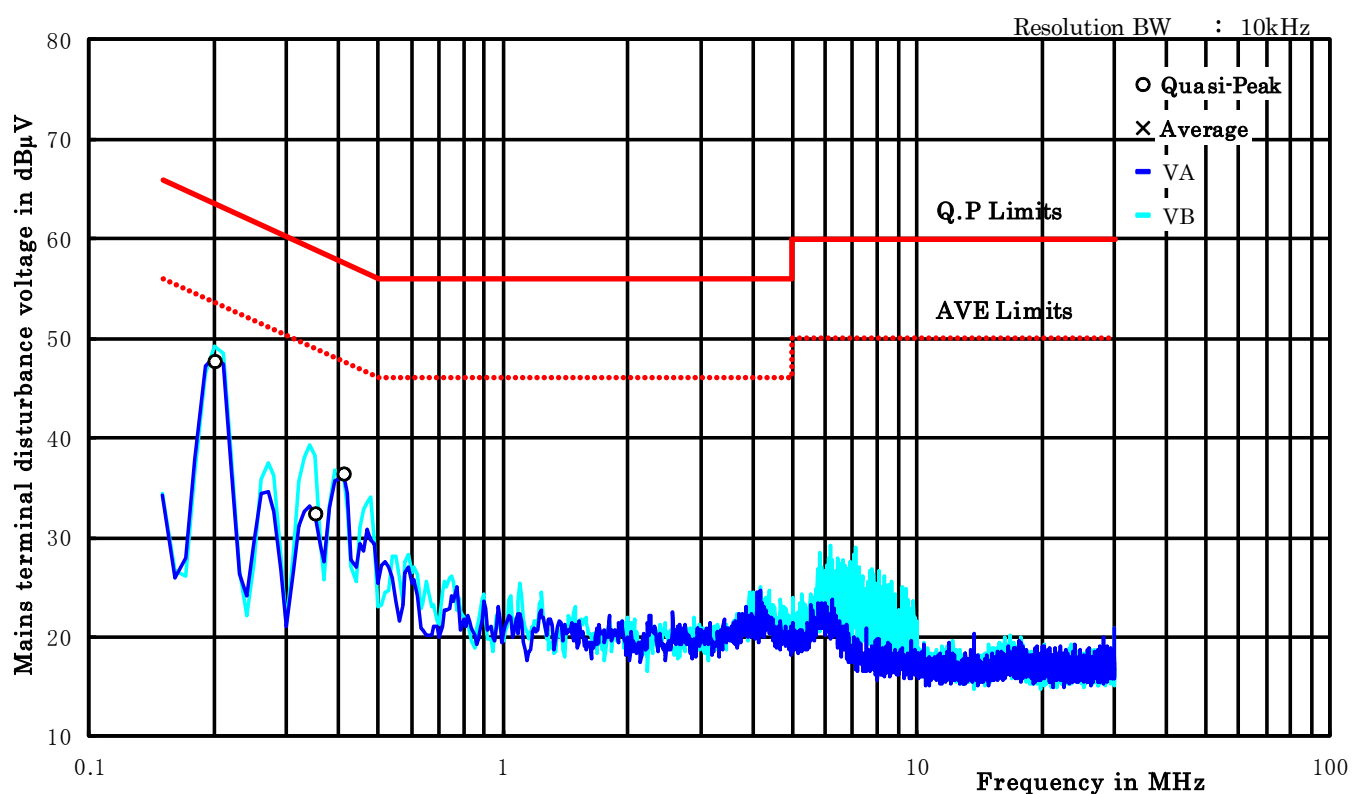
7.8.4 Test Data

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

7.8.4.1 Host : DPP-250

Date : July 18, 2014

Temp. : 24°C Humi. : 60%



Freq. [MHz]	Factor. [dB]	Meter Reading[dBμV]				Limit [dBμV]		Result. [dBμV]		Margin [dB]	
		QP		AV		QP	AV	QP	AV	QP	AV
		VA	VB	VA	VB						
0.20	21.3	26.5	26.3	-	-	63.6	53.6	47.8	-	15.8	-
0.35	20.4	< 10.0	12.1	-	-	59.0	49.0	32.5	-	26.5	-
0.41	20.4	13.7	16.1	-	-	57.6	47.6	36.5	-	21.1	-
6.16	20.2	< 10.0	< 10.0	-	-	60.0	50.0	< 30.2	-	> 29.8	-

Note : 1) QP : CISPR Quasi-Peak. ; AV : Average.

2) VA : One end & grounded ; VB : The other end & grounded

3) The symbol of '<' means 'or less' .

4) The symbol of '>' means 'or greater' .

5) The symbol of '-' means 'Not applicable' .

6) Factor includes an A. M. N. factor, Hi-Pass Filter loss, Pulse Limiter loss and a cable loss.

7) A sample calculation was made at 0.2MHz

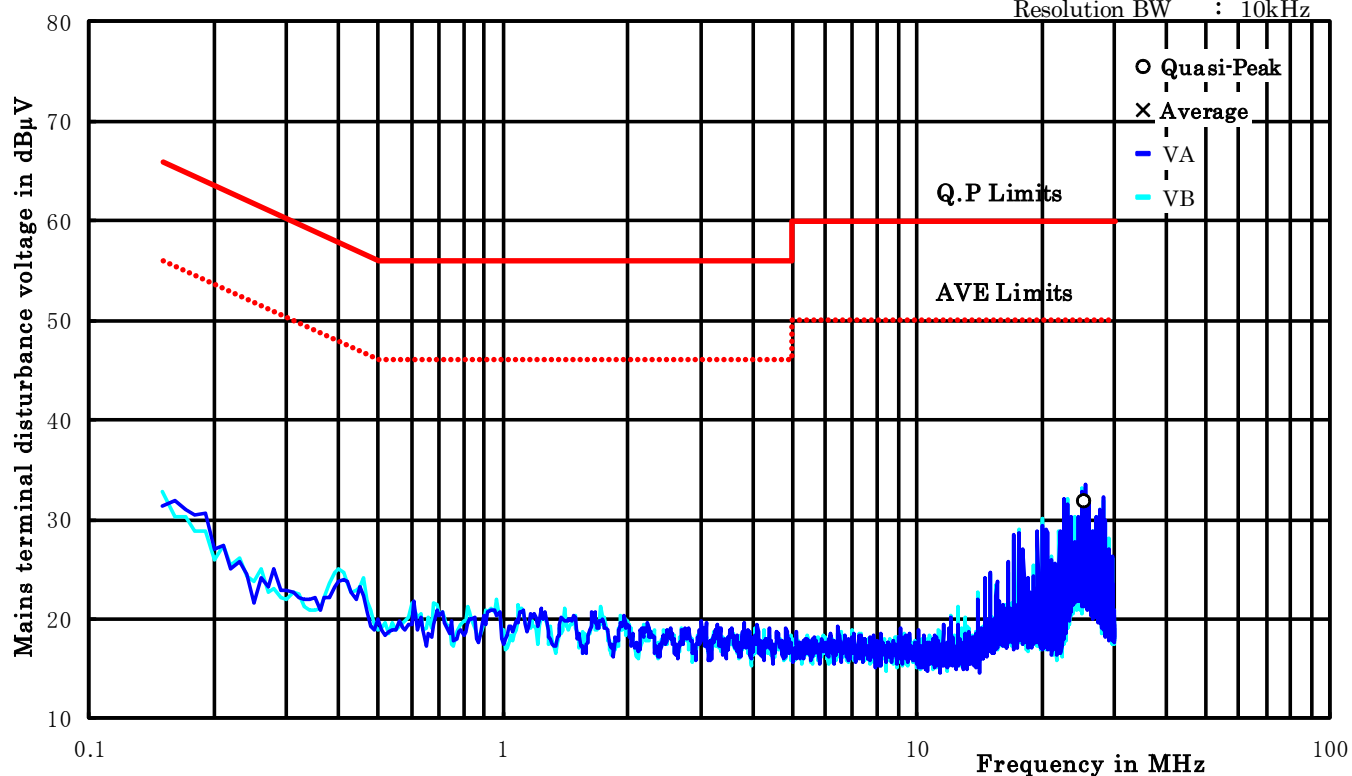
Factor + Meter Reading = 21.3 + 26.5 = 47.8

7.8.4.2 Host : DPP-450L

Date : July 18, 2014

Temp. : 24°C Humi. : 60%

Resolution BW : 10kHz



Freq. [MHz]	Factor. [dB]	Meter Reading[dBμV]				Limit [dBμV]		Result. [dBμV]		Margin [dB]	
		QP		AV		QP	AV	QP	AV	QP	AV
0.15	22.4	<	10.0	<	10.0	-	-	66.0	56.0	<	32.4
0.46	20.3	<	10.0	<	10.0	-	-	56.7	46.7	<	30.3
25.13	20.8	11.2	11.0	-	-	60.0	50.0	32.0	-	28.0	-

Note : 1) QP : CISPR Quasi-Peak. ; AV : Average.

2) VA : One end & grounded ; VB : The other end & grounded

3) The symbol of '<' means 'or less' .

4) The symbol of '>' means 'or greater' .

5) The symbol of '-' means 'Not applicable' .

6) Factor includes an A. M. N. factor, Hi-Pass Filter loss, Pulse Limiter loss and a cable loss.

7) A sample calculation was made at 0.15MHz

Factor + Meter Reading = 22.4 + 10.0 = 32.4

7.9 Radiated Emission

The requirements are ☒ - Applicable ☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

☒ - Passed ☐ - Failed ☐ - Not judged

7.9.1 Worst Point and Measurement Uncertainty

Min. Limit Margin (Average) 0.6 dB at 4960.0 MHz

Uncertainty of Measurement Results

9 kHz – 30 MHz	<u>+/-2.5</u>	dB(2 σ)
30 MHz – 300 MHz	<u>+/-4.6</u>	dB(2 σ)
300 MHz – 1000 MHz	<u>+/-4.5</u>	dB(2 σ)
1 GHz – 6 GHz	<u>+/-4.2</u>	dB(2 σ)
6 GHz – 18 GHz	<u>+/-4.6</u>	dB(2 σ)
18 GHz – 26.5 GHz	<u>+/-4.8</u>	dB(2 σ)
26.5 GHz – 40 GHz	<u>+/-4.8</u>	dB(2 σ)

Remarks : Min Limit Margin : Host DP-450L

7.9.2 Test Site and Instruments

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Anechoic Chamber A	--	TDK	1	2013/9	1 Year
Test Receiver	ESI26	Rohde & Schwarz	13	2014/6	1 Year
Loop Antenna	HFH2-Z2	Rohde & Schwarz	21	2013/11	1 Year
Biconical Antenna	BBA9106	Schwarzbeck	C-43	2014/5	1 Year
Log-periodic Antenna	UHALP9108-A1	Schwarzbeck	C-28	2014/5	1 Year
Log-periodic Antenna	HL050	Rohde & Schwarz	198	2013/12	1 Year
Horn Antenna	3160-08	EMCO	237	2014/5	1 Year
Horn Antenna	3160-09	EMCO	238	2013/12	1 Year
RF Cable	5D-2W	Fujikura	38	2014/2	1 Year
RF Cable	F130-S1S1-394	MEGA PHASE	195	2014/4	1 Year
RF Cable	SUCOFLEC 102E	HUBER+SHUNER	241	2013/10	1 Year
RF Amplifier	JS4-00102600-28-5A	MITEQ	57	2013/8	1 Year
Band Rejection Filter	BRM12294	MICRO-TRONICS	78	2013/10	1 Year

7.9.3 Test Method and Test Setup (Diagrammatic illustration)

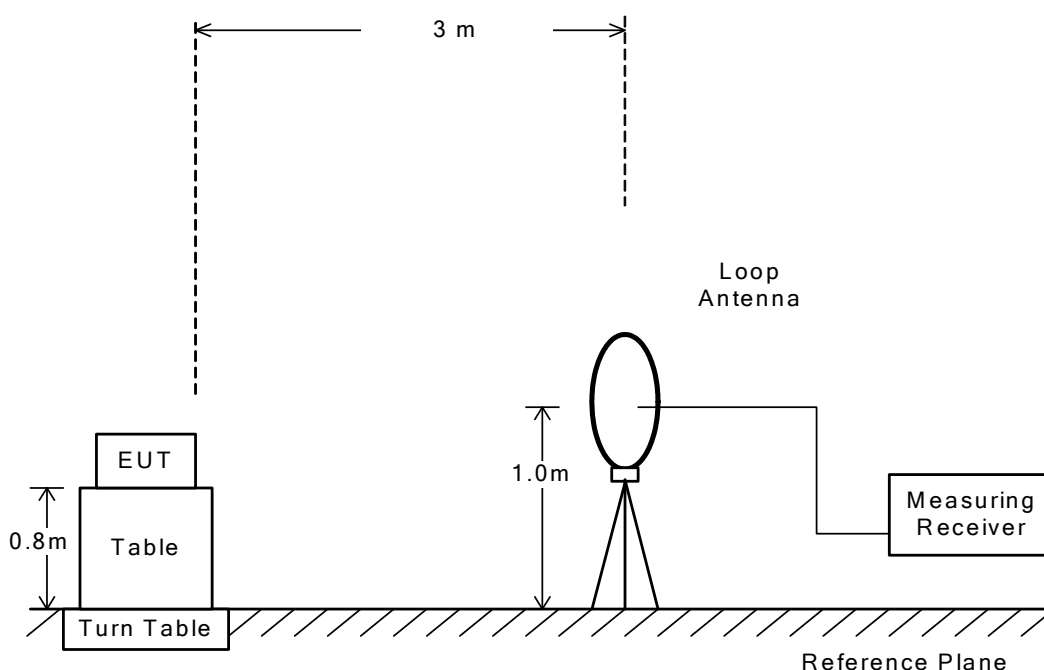
7.9.3.1 Radiated Emission 9 kHz – 30 MHz

The preliminary tests were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.

The EUT configuration(in X, Y and Z axis), 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 –



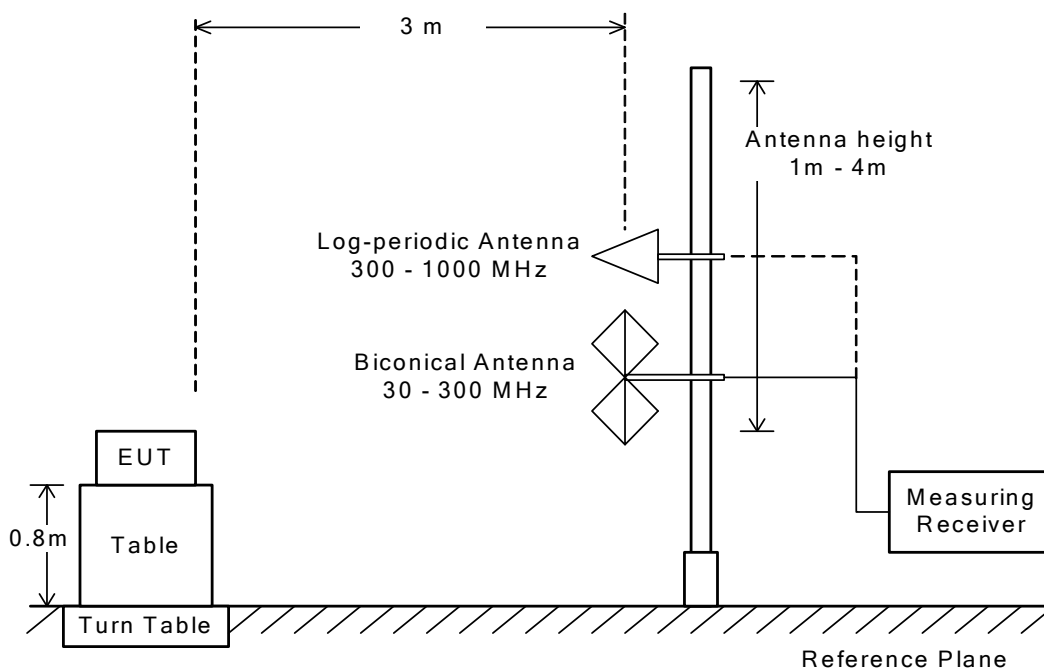
7.9.3.2 Radiated Emission 30 MHz – 1000 MHz

The preliminary tests were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.

The EUT configuration(in X, Y and Z axis), 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(in X, Y and Z axis), cable configuration and mode of operation were determined for producing the maximum level of emissions.

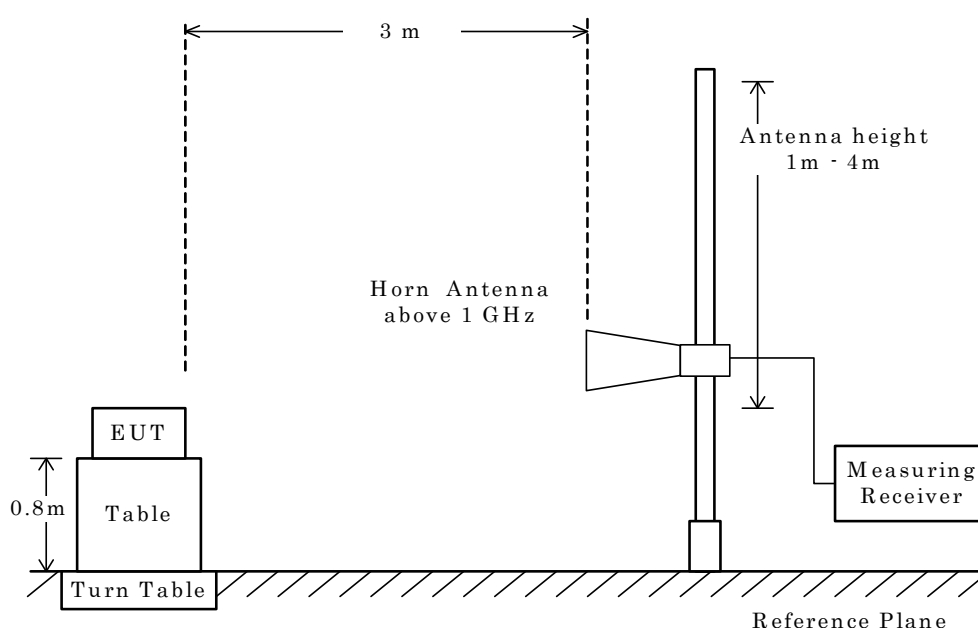
This configurations was used for the final tests.

The setting of the measuring instruments are shown as follows:

Type	Peak	Average
Detector Function	Peak	RMS
Res. Bandwidth	1 MHz	1 MHz
Video Bandwidth	3 MHz	$\geq 1/T * 1)$
Sweep Time	AUTO	AUTO
Trace	Max Hold	Max Hold

Note: 1. T: Minimum transmission duration

– Side View –



NOTE

The antenna height is scanned depending on the EUT's size and mounting height.

7.9.4 Test Data

7.9.4.1 Band-edge Compliance

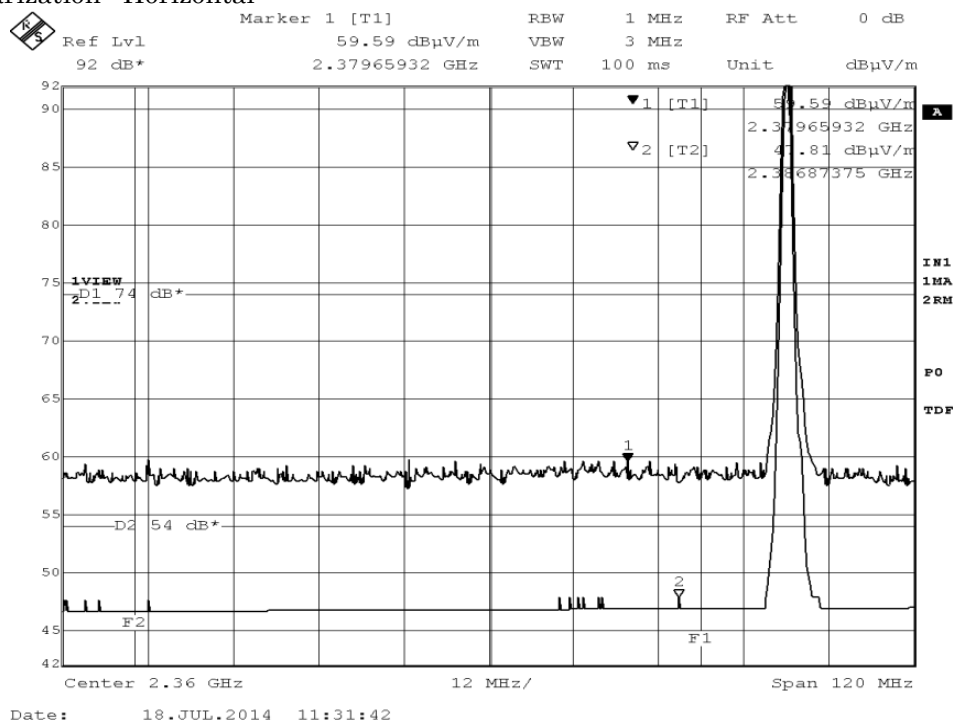
7.9.4.1.1 Host : DPP-250

Test Date : July 18, 2014

Temp.:24°C, Humi:60%

Mode of EUT : BDR, Hopping off (0ch: 2402 MHz) (worst case)

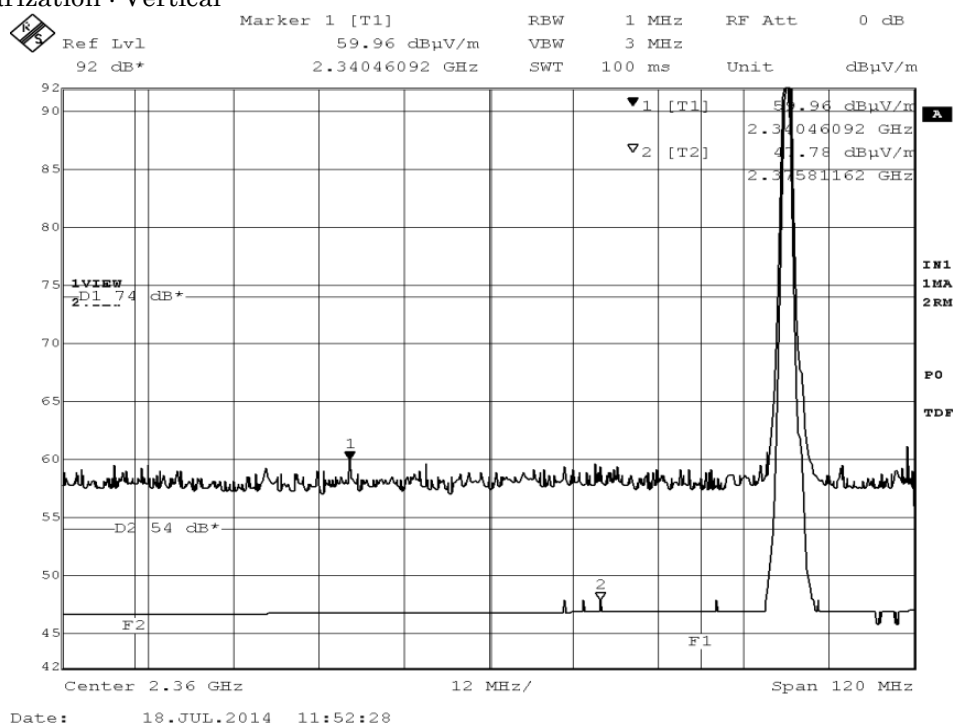
Antenna Polarization : Horizontal



Note: The trace 1 is Peak detection. The trace 2 is RMS detection.

Mode of EUT : BDR, Hopping off (0ch: 2402 MHz) (worst case)

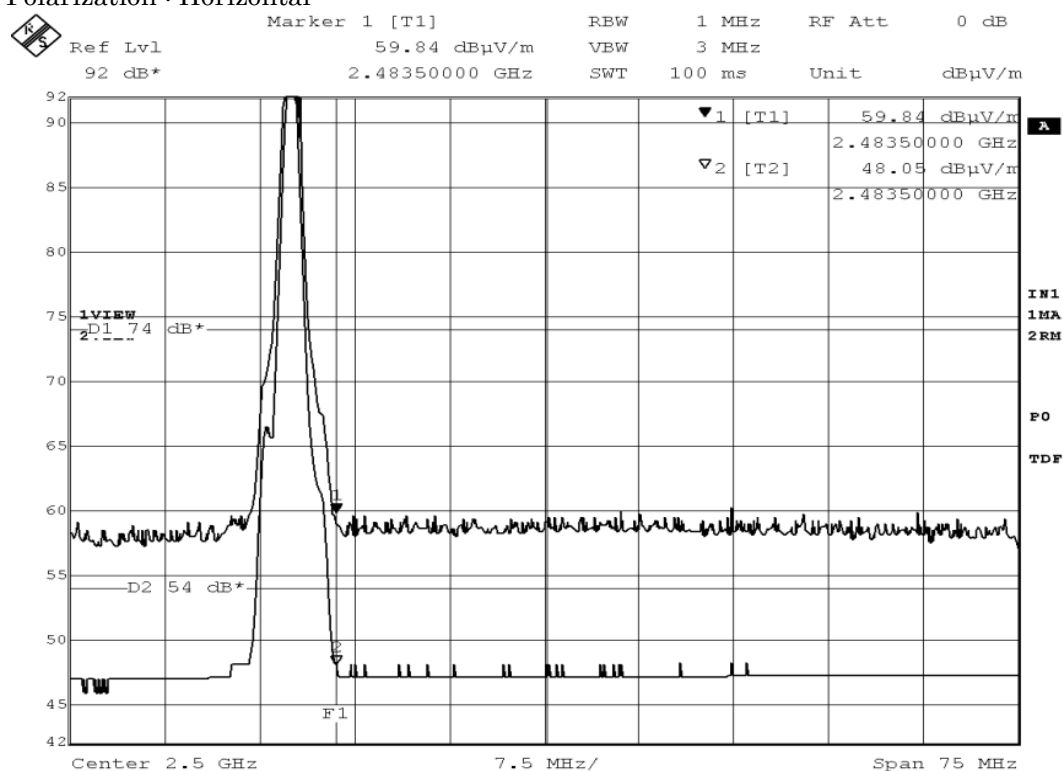
Antenna Polarization : Vertical



Note: The trace 1 is Peak detection. The trace 2 is RMS detection.

Mode of EUT : BDR, Hopping off (78ch: 2480 MHz) (worst case)

Antenna Polarization : Horizontal

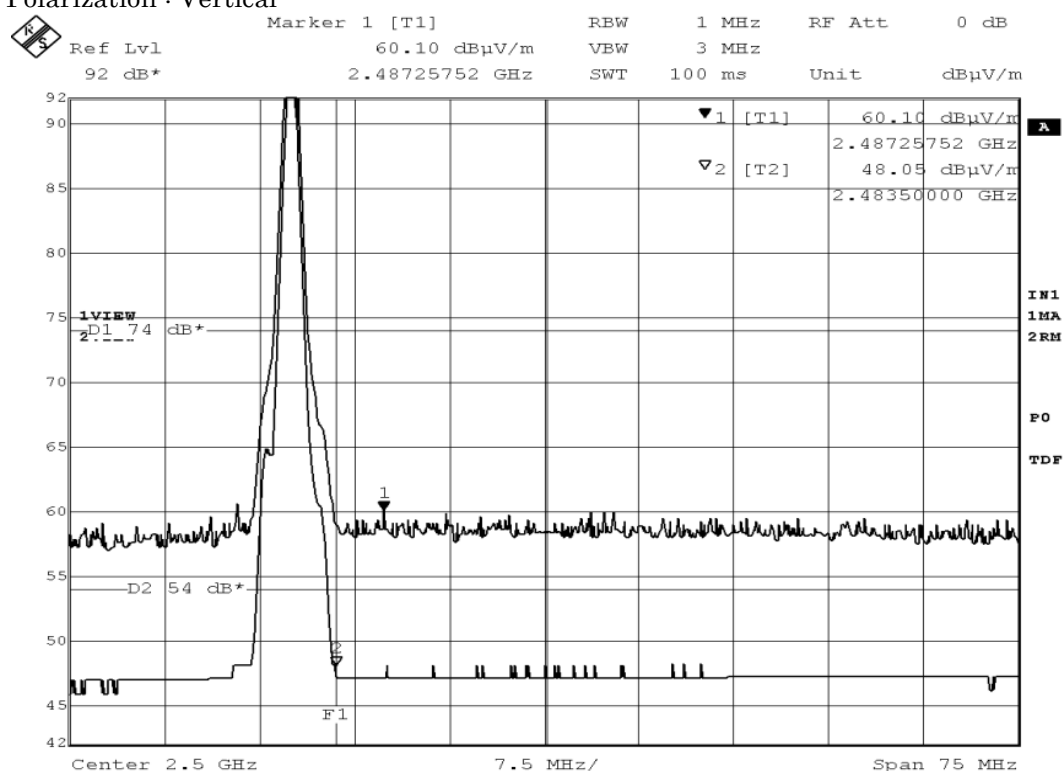


Date: 18.JUL.2014 11:40:49

Note: The trace 1 is Peak detection. The trace 2 is RMS detection.

Mode of EUT : BDR, Hopping off (78ch: 2480 MHz) (worst case)

Antenna Polarization : Vertical



Date: 18.JUL.2014 11:58:04

Note: The trace 1 is Peak detection. The trace 2 is RMS detection.

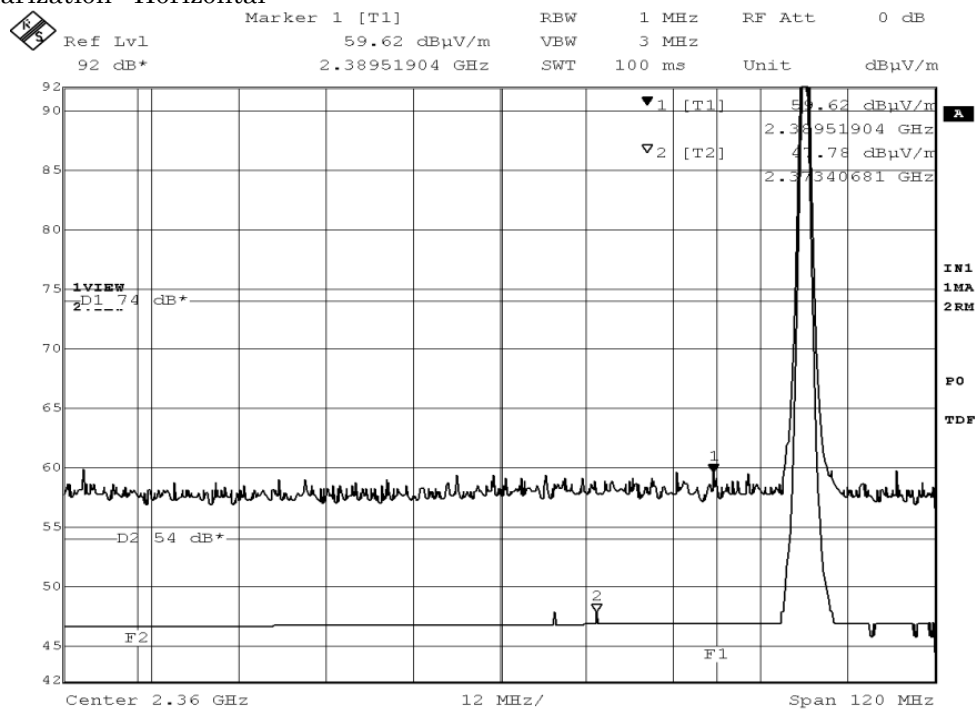
7.9.4.1.2 Host : DPP-450L

Test Date : July 18, 2014

Temp.:24°C, Humi:60%

Mode of EUT : BDR, Hopping off (0ch: 2402 MHz) (worst case)

Antenna Polarization : Horizontal

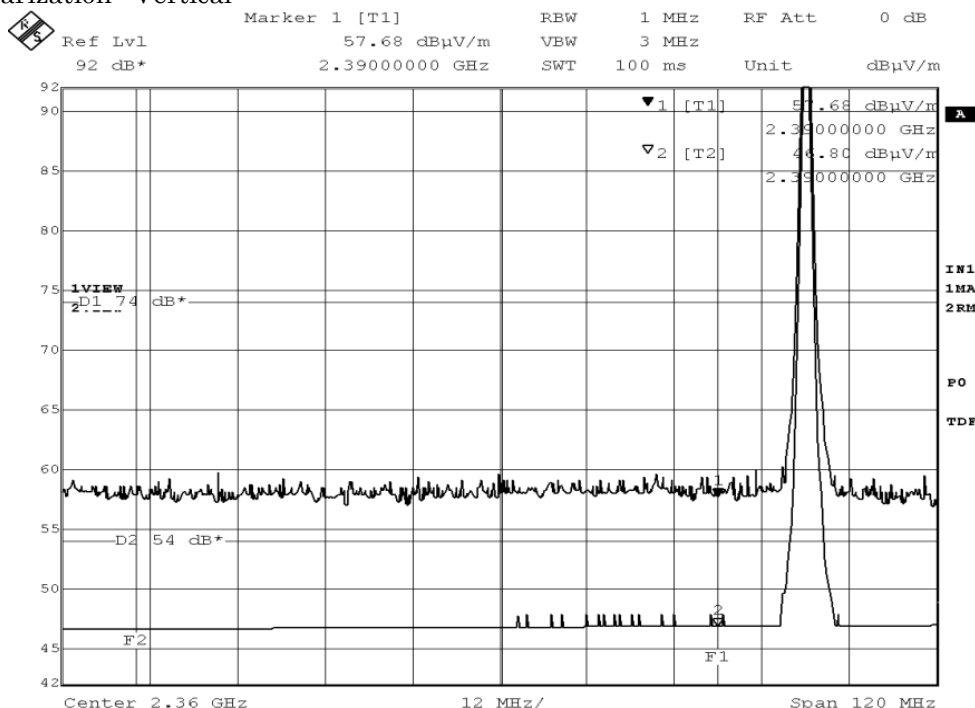


Date: 18.JUL.2014 16:19:14

Note: The trace 1 is Peak detection. The trace 2 is RMS detection.

Mode of EUT : BDR, Hopping off (0ch: 2402 MHz) (worst case)

Antenna Polarization : Vertical

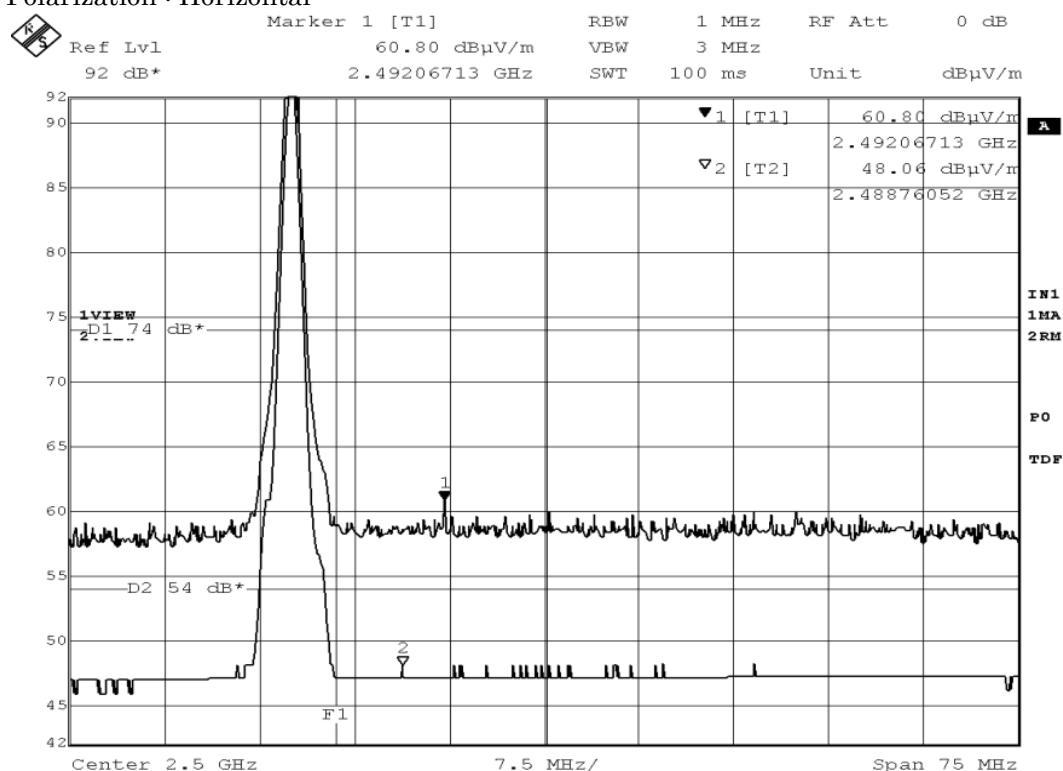


Date: 18.JUL.2014 16:40:39

Note: The trace 1 is Peak detection. The trace 2 is RMS detection.

Mode of EUT : BDR, Hopping off (78ch: 2480 MHz) (worst case)

Antenna Polarization : Horizontal

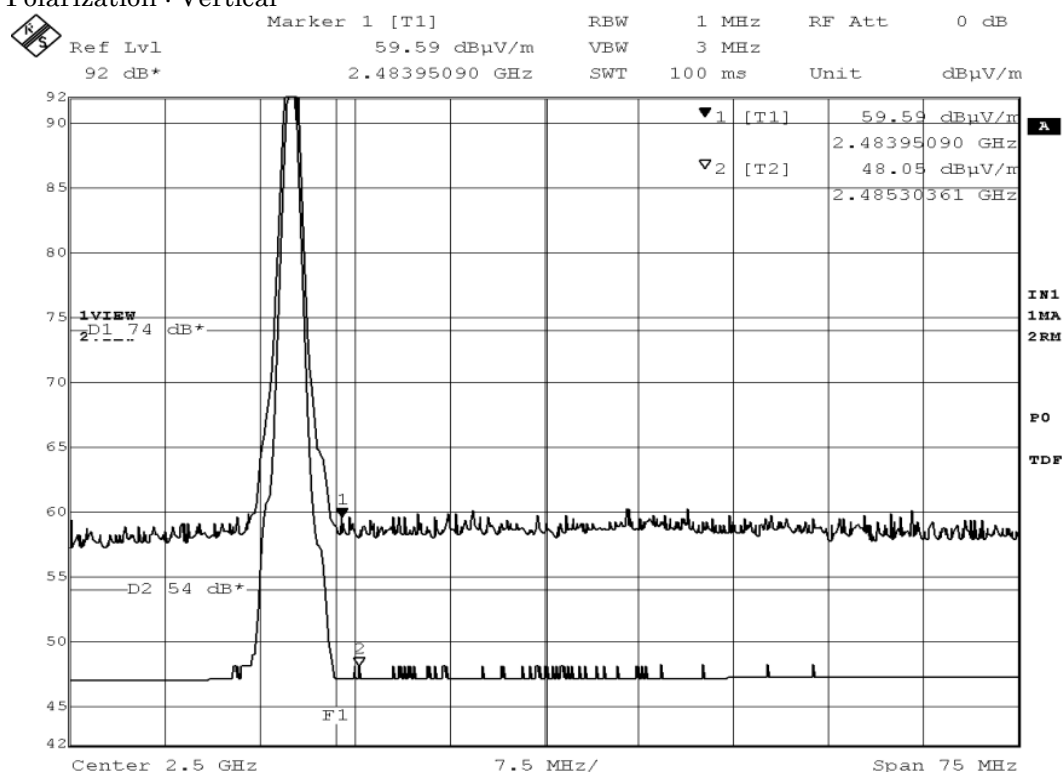


Date: 18.JUL.2014 16:28:23

Note: The trace 1 is Peak detection. The trace 2 is RMS detection.

Mode of EUT : BDR, Hopping off (78ch: 2480 MHz) (worst case)

Antenna Polarization : Vertical



Date: 18.JUL.2014 16:46:09

Note: The trace 1 is Peak detection. The trace 2 is RMS detection.

7.4.9.2 Other Spurious Emission (9kHz – 30MHz)Test Date : July 7, 2014Temp.:24°C, Humi:60%

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.

7.4.9.3 Other Spurious Emission (30MHz – 1000MHz)

7.4.9.3.1 Host : DPP-250

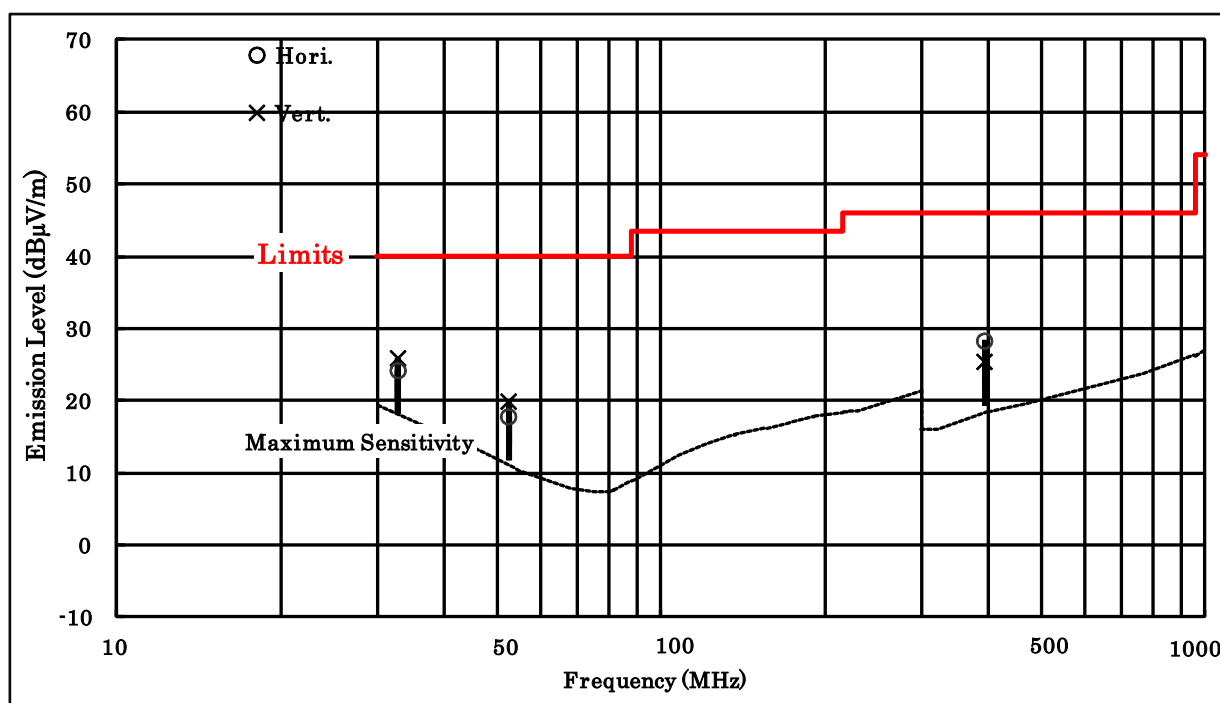
Mode of EUT : All modes have been investigated and the worst case mode has been listed.

Worst point Axis : Y

Date : July 7, 2014

Temp : 24°C Humi : 60%

Frequency (MHz)	Antenna Factor (dB/m)	Meter Reading (dBμV)		Limits (dBμV/m) Q.P	Emission Level (dBμV/m)		Margin (dB)	
		Hori.	Vert.		Hori.	Vert.	Hori.	Vert.
32.7	18.3	6.0	7.7	40.0	24.3	26.0	15.7	14.0
52.2	11.2	6.7	8.8	40.0	17.9	20.0	22.1	20.0
391.2	18.2	10.2	7.3	46.0	28.4	25.5	17.6	20.5



Notes: 1) The testing location : Anechoic Chamber B Distance : 3 m

2) The spectrum was checked from 30 MHz to 1000 MHz.

3) Antenna factor includes the cable loss.

4) Hori. : Horizontal polarization Vert. : Vertical polarization

5) Q.P: Quasi-Peak Detector

6) The symbol of "<" means "or less", ">" means "more than".

7) A sample calculation was made at 32.7 MHz

(Antenna Factor) + (Meter Reading) = 18.3 + 7.7 = 26.0 dBμV

7.4.9.3.2 Host : DPP-450L

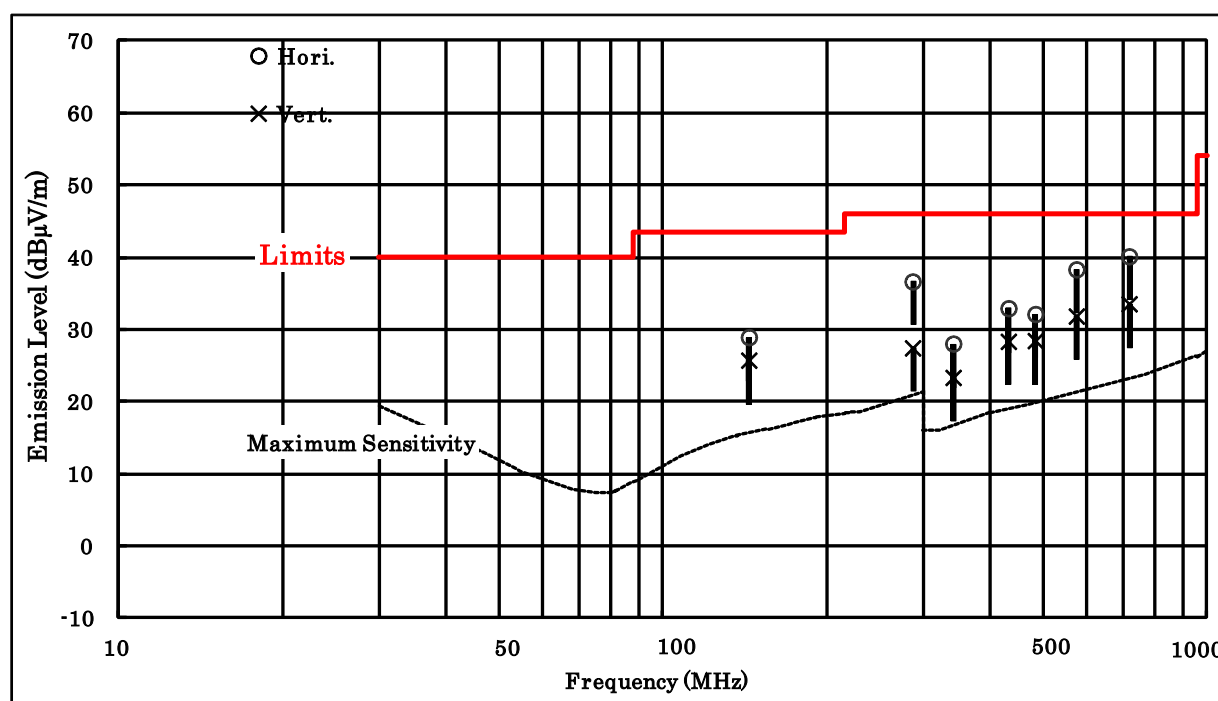
Mode of EUT : All modes have been investigated and the worst case mode has been listed.

Worst point Axis : Z

Date : July 7, 2014

Temp : 24°C Humi : 60%

Frequency (MHz)	Antenna Factor (dB/m)	Meter Reading (dBμV)		Limits (dBμV/m) Q.P	Emission Level (dBμV/m)		Margin (dB)	
		Hori.	Vert.		Hori.	Vert.	Hori.	Vert.
143.5	15.7	13.3	10.1	43.5	29.0	25.8	14.5	17.7
286.9	20.6	16.1	6.9	46.0	36.7	27.5	9.3	18.5
340.7	16.5	11.6	6.9	46.0	28.1	23.4	17.9	22.6
430.4	18.9	14.1	9.5	46.0	33.0	28.4	13.0	17.6
482.4	19.7	12.5	8.8	46.0	32.2	28.5	13.8	17.5
573.8	21.6	16.8	10.3	46.0	38.4	31.9	7.6	14.1
717.2	23.5	16.7	10.1	46.0	40.2	33.6	5.8	12.4



Notes: 1) The testing location : Anechoic Chamber B Distance : 3 m

2) The spectrum was checked from 30 MHz to 1000 MHz.

3) Antenna factor includes the cable loss.

4) Hori. : Horizontal polarization Vert. : Vertical polarization

5) Q.P: Quasi-Peak Detector

6) The symbol of "<" means "or less", ">" means "more than".

7) A sample calculation was made at 143.5 MHz

(Antenna Factor) + (Meter Reading) = 15.7 + 10.1 = 25.8 dBμV

7.4.9.4 Other Spurious Emission (Above 1000MHz)**7.4.9.4.1 Host : DPP-250**

Mode of EUT : BDR (worst case)

Worst point Axis : X

Date : July 18, 2014

Temp. : 24 °C

Humi. : 60 %

Frequency	Antenna	Corr.	Meter Readings [dB(μV)]				Limits		Results		Margin		Remarks
	Factor	Factor	Horizontal		Vertical		[dB(μV/m)]		[dB(μV/m)]		[dB]		
	[MHz]	[dB(1/m)]	[dB]	PK	AVE	PK	AVE	PK	AVE	PK	AVE	PK	
Test condition : Tx Low Ch													
1602.0	25.9	-26.9	46.5	42.7	45.7	41.8	74.0	54.0	45.5	41.7	28.5	12.3	A/B
4804.0	35.7	-25.7	52.7	40.5	51.5	39.9	74.0	54.0	62.7	50.5	11.3	3.5	A/B
7206.0	38.7	-34.4	< 40.0	< 27.0	< 40.0	< 27.0	74.0	54.0	< 44.3	< 31.3	> 29.7	> 22.7	A/B
9608.0	41.2	-32.6	< 40.0	< 27.0	< 40.0	< 27.0	74.0	54.0	< 48.6	< 35.6	> 25.4	> 18.4	A/B
12010.0	43.4	-32.3	< 40.0	< 27.0	< 40.0	< 27.0	74.0	54.0	< 51.0	< 38.0	> 23.0	> 16.0	A/B
19216.0	40.3	-29.2	< 40.0	< 27.0	< 40.0	< 27.0	74.0	54.0	< 51.0	< 38.0	> 23.0	> 16.0	A/B
Test condition : Tx Mid Ch													
1626.7	26.4	-26.9	46.6	43.0	44.5	39.9	74.0	54.0	46.1	42.5	27.9	11.5	A/B
4882.0	36.2	-25.7	54.3	42.3	53.3	41.9	74.0	54.0	64.8	52.8	9.2	1.2	A/B
7323.0	38.8	-34.3	< 40.0	< 27.0	< 40.0	< 27.0	74.0	54.0	< 44.5	< 31.5	> 29.5	> 22.5	A/B
9764.0	41.2	-32.5	< 40.0	< 27.0	< 40.0	< 27.0	74.0	54.0	< 48.7	< 35.7	> 25.3	> 18.3	A/B
12205.0	44.0	-32.3	< 40.0	< 27.0	< 40.0	< 27.0	74.0	54.0	< 51.7	< 38.7	> 22.3	> 15.3	A/B
21969.0	40.2	-26.6	< 40.0	< 27.0	< 40.0	< 27.0	74.0	54.0	< 53.6	< 40.6	> 20.4	> 13.4	A/B
Test condition : Tx High Ch													
1652.7	26.8	-26.8	47.2	44.1	46.3	42.3	74.0	54.0	47.2	44.1	26.8	9.9	A/B
4960.0	35.8	-25.7	55.3	43.2	54.7	42.7	74.0	54.0	65.4	53.3	8.6	0.7	A/B
7440.0	39.2	-34.2	< 40.0	< 27.0	< 40.0	< 27.0	74.0	54.0	< 44.9	< 31.9	> 29.1	> 22.1	A/B
9920.0	42.2	-32.4	< 40.0	< 27.0	< 40.0	< 27.0	74.0	54.0	< 49.8	< 36.8	> 24.2	> 17.2	A/B
12400.0	44.0	-32.3	< 40.0	< 27.0	< 40.0	< 27.0	74.0	54.0	< 51.7	< 38.7	> 22.3	> 15.3	A/B
22320.0	40.2	-26.5	< 40.0	< 27.0	< 40.0	< 27.0	74.0	54.0	< 53.7	< 40.7	> 20.3	> 13.3	A/B

Calculated result at 1654.1 MHz, as the worst point shown on underline:

Antenna Factor = 35.8 dB(1/m)

Corr. Factor = -25.7 dB

+) Meter Reading = 43.2 dB(μV)

Result = 53.3 dB(μV/m)

Minimum Margin: 54.0 - 53.3 = 0.7 (dB)

NOTES

1. Test Distance : 3 m (1 GHz to 6 GHz) and 1 m (6 GHz to 25 GHz)
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[dB] - Pre-Amp. Gain [dB] (1 GHz - 6 GHz)
 Corr. Factor [dB] = Cable Loss - Measurement distance conversion[dB] - Pre-Amp. Gain [dB] (6 GHz - 25 GHz)
 Measurement distance conversion[dB] = 20 * Log (1m / 3m)
4. The symbol of "<" means "or less".
5. The symbol of ">" means "more than".
6. PK : Peak Detector / AVE : RMS Detector
7. Setting of measuring instrument(s) :

	Detector Function	Resolution B.W.	Video B.W.	Sweep Time
A	Peak	1 MHz	3 MHz	AUTO
B	RMS	1 MHz	3 MHz	AUTO

7.4.9.4.2 Host : DPP-450L

Mode of EUT : BDR (worst case)

Worst point Axis : Z

Date : July 18, 2014

Temp. : 24 °C

Humi. : 60 %

Frequency [MHz]	Antenna Factor	Corr. Factor	Meter Readings [dB(μV)]				Limits [dB(μV/m)]		Results [dB(μV/m)]		Margin [dB]		Remarks
	[dB(1/m)]	[dB]	Horizontal		Vertical		PK	AVE	PK	AVE	PK	AVE	
Test condition : Tx Low Ch													
1602.1	25.9	-26.9	42.3	36.0	42.4	36.2	74.0	54.0	41.4	35.2	32.6	18.8	A/B
4804.0	35.7	-25.7	53.0	43.1	52.4	43.0	74.0	54.0	63.0	53.1	11.0	0.9	A/B
7206.0	38.7	-34.4	< 40.0	< 27.0	< 40.0	< 27.0	74.0	54.0	< 44.3	< 31.3	> 29.7	> 22.7	A/B
9608.0	41.2	-32.6	< 40.0	< 27.0	< 40.0	< 27.0	74.0	54.0	< 48.6	< 35.6	> 25.4	> 18.4	A/B
12010.0	43.4	-32.3	< 40.0	< 27.0	< 40.0	< 27.0	74.0	54.0	< 51.0	< 38.0	> 23.0	> 16.0	A/B
19216.0	40.3	-29.2	< 40.0	< 27.0	< 40.0	< 27.0	74.0	54.0	< 51.0	< 38.0	> 23.0	> 16.0	A/B
Test condition : Tx Mid Ch													
1626.7	26.4	-26.9	43.7	38.1	43.3	37.6	74.0	54.0	43.2	37.6	30.8	16.4	A/B
4882.0	36.2	-25.7	49.9	42.5	50.6	42.1	74.0	54.0	61.1	53.0	12.9	1.0	A/B
7323.0	38.8	-34.3	< 40.0	< 27.0	< 40.0	< 27.0	74.0	54.0	< 44.5	< 31.5	> 29.5	> 22.5	A/B
9764.0	41.2	-32.5	< 40.0	< 27.0	< 40.0	< 27.0	74.0	54.0	< 48.7	< 35.7	> 25.3	> 18.3	A/B
12205.0	44.0	-32.3	< 40.0	< 27.0	< 40.0	< 27.0	74.0	54.0	< 51.7	< 38.7	> 22.3	> 15.3	A/B
21969.0	40.2	-26.6	< 40.0	< 27.0	< 40.0	< 27.0	74.0	54.0	< 53.6	< 40.6	> 20.4	> 13.4	A/B
Test condition : Tx High Ch													
1652.7	26.8	-26.8	44.3	38.4	42.9	36.3	74.0	54.0	44.3	38.4	29.7	15.6	A/B
4960.0	35.8	-25.7	51.2	43.3	50.3	40.5	74.0	54.0	61.3	53.4	12.7	0.6	A/B
7440.0	39.2	-34.2	< 40.0	< 27.0	< 40.0	< 27.0	74.0	54.0	< 44.9	< 31.9	> 29.1	> 22.1	A/B
9920.0	42.2	-32.4	< 40.0	< 27.0	< 40.0	< 27.0	74.0	54.0	< 49.8	< 36.8	> 24.2	> 17.2	A/B
12400.0	44.0	-32.3	< 40.0	< 27.0	< 40.0	< 27.0	74.0	54.0	< 51.7	< 38.7	> 22.3	> 15.3	A/B
22320.0	40.2	-26.5	< 40.0	< 27.0	< 40.0	< 27.0	74.0	54.0	< 53.7	< 40.7	> 20.3	> 13.3	A/B

Calculated result at 4960.0 MHz, as the worst point shown on underline:

Antenna Factor	=	35.8	dB(1/m)
Corr. Factor	=	-25.7	dB
+) Meter Reading	=	43.3	dB(μV)
Result	=	53.4	dB(μV/m)

Minimum Margin: 54.0 - 53.4 = 0.6 (dB)

NOTES

1. Test Distance : 3 m (1 GHz to 6 GHz) and 1 m (6 GHz to 25 GHz)
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[dB] - Pre-Amp. Gain [dB] (1 GHz - 6 GHz)
Corr. Factor [dB] = Cable Loss - Measurement distance conversion[dB] - Pre-Amp. Gain [dB] (6 GHz - 25 GHz)
Measurement distance conversion[dB] = 20 * Log (1m / 3m)
4. The symbol of "<" means "or less".
5. The symbol of ">" means "more than".
6. PK : Peak Detector / AVE : RMS Detector
7. Setting of measuring instrument(s) :

	Detector Function	Resolution B.W.	Video B.W.	Sweep Time
A	Peak	1 MHz	3 MHz	AUTO
B	RMS	1 MHz	3 MHz	AUTO

RF Exposure

KDB 447498D01(V05) has the following exclusion for portable devices:

The 1g and 10g SAR test exclusion thresholds for 100MHz to 6GHz at test separation distances $\leq 50\text{mm}$ are determined by:

$$[p(\text{mW}) / d(\text{mm})] * [\sqrt{f(\text{GHz})}] \leq 3.0$$

for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

- $p(\text{mW})$ is max. power of channel, including tune-up tolerance.
- $d(\text{mm})$ is min. test separation distance.
- $f(\text{GHz})$ is the RF channel transmit frequency in GHz.
- Power and distance are rounded to the nearest mW and mm before calculation.
- The result is rounded to one decimal place for comparison.

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

This device has $f=2.48\text{GHz}$ and distance = 5mm (minimum separation distance: 5mm was used in the calculation) and the maximum tune-up tolerance limit was 4mW

So for this device:

$$4(\text{mW}) / 5(\text{mm}) * \sqrt{2.48(\text{GHz})} = 1.3$$

*This is less than 3.0, so no SAR is required.