RADIO TEST REPORT

Test Report No. : 10762685H-R1

Applicant	:	**MITSUBISHI ELECTRIC CORPORATION SANDA WORKS**
Type of Equipment	:	**Car Audio**
Model No.	:	**RV-1M**
FCC ID	:	**UJHRV1M**
Test regulation	:	**FCC Part 15 Subpart C: 2015**
Test Result	:	**Complied**

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.
6. This test report covers Radio technical requirements. It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
7. This report is a revised version of 10762685H. 10762685H is replaced with this report.

Date of test: April 21 to 29, 2015

Representative test engineer:
S. Matsuyama
Satofumi Matsuyama
Engineer
Consumer Technology Division

Approved by:
T. Hatakeda
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Leader
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NVLAP LAB CODE: 200572-0

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*As for the range of Accreditation in NVLAP, you may refer to the WEB address,
http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap

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REVISION HISTORY

Original Test Report No.: 10762685H

Revision	Test report No.	Date	Page revised	Contents
- (Original)	10762685H	May 13, 2015	-	-
1	10762685H-R1	June 30, 2015	P.5	Correction of FCC Part 15.203 Antenna requirement sentence
1	10762685H-R1	June 30, 2015	P.9	Correction of explanatory note for test voltage

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SECTION 1: Customer information

Company Name	:	MITSUBISHI ELECTRIC CORPORATION SANDA WORKS
Address	:	2-3-33, Miwa, Sanda-city, Hyogo, 669-1513, Japan
Telephone Number	:	+81-79-559-3620
Facsimile Number	:	+81-79-559-3875
Contact Person	:	Keiichi Shiode

SECTION 2: Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment	:	Car Audio
Model No.	:	RV-1M
Serial No.	:	Refer to Clause 4.2
Rating	:	DC 12 V
Receipt Date of Sample	:	April 18, 2015
Country of Mass-production	:	China
Condition of EUT	:	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT	:	No Modification by the test lab

2.2 Product Description

General Specification

Clock frequency(ies) in the system	:	26MHz

Radio Specification

	Bluetooth Ver.2.1 with EDR function
Frequency of operation	2402-2480MHz
Type of modulation	FHSS (GFSK, π/4-DQPSK, 8-DPSK)
Channel spacing	1MHz
Antenna type	Pattern antenna
Antenna Gain	2.0dBi
Antenna Connector type	-

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	:	FCC Part 15 Subpart C: 2015, final revised on January 21, 2015
Title	:	FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators Section 15.207 Conducted limits Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz

3.2 Procedures and results

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
Conducted Emission	**FCC:** ANSI C63.4-2009 7. AC powerline conducted emission measurements **IC:** RSS-Gen 8.8	**FCC:** Section 15.207 **IC:** RSS-Gen 8.8	N/A	N/A *1)	-
Carrier Frequency Separation	**FCC:** FCC Public Notice DA 00-705 **IC:** -	**FCC:** Section15.247(a)(1) **IC:** RSS-247 5.1 (2)	See data.	Complied	Conducted
20dB Bandwidth	**FCC:** FCC Public Notice DA 00-705 **IC:** -	**FCC:** Section15.247(a)(1) **IC:** RSS-247 5.1 (1)		Complied	Conducted
Number of Hopping Frequency	**FCC:** FCC Public Notice DA 00-705 **IC:** -	**FCC:** Section15.247(a)(1)(iii) **IC:** RSS-247 5.1 (4)		Complied	Conducted
Dwell time	**FCC:** FCC Public Notice DA 00-705 **IC:** -	**FCC:** Section15.247(a)(1)(iii) **IC:** RSS-247 5.1 (4)		Complied	Conducted
Maximum Peak Output Power	**FCC:** FCC Public Notice DA 00-705 **IC:** RSS-Gen 6.12	**FCC:** Section15.247(a)(b)(1) **IC:** RSS-247 5.4 (2)		Complied	Conducted
Spurious Emission & Band Edge Compliance	**FCC:** FCC Public Notice DA 00-705 **IC:** RSS-Gen 6.13	**FCC:** Section15.247(d) **IC:** RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	1.4dB 33.335MHz, QP, Vert.	Complied	Conducted/ Radiated

Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.
*1) The test is not applicable since the EUT is not the device that is designed to be connected to the public utility (AC) power line.

* In case any questions arise about test procedure, ANSI C63.4: 2009 is also referred.

FCC 15.31 (e)
The EUT provides stable voltage (DC3.3V) constantly to the wireless transmitter regardless of input voltage.
Instead of a new battery, DC power supply was used for the test.
That does not affect the test result, therefore the EUT complies with the requirement.

FCC Part 15.203 Antenna requirement
It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% Occupied Bandwidth	**IC:** RSS-Gen 6.6	**IC:** -	N/A	-	Conducted

Other than above, no addition, exclusion nor deviation has been made from the standard.

3.4 Uncertainty

EMI
The following uncertainties have been calculated to provide a confidence level of 95% using a coverage factor k=2.

Test room (semi-anechoic chamber)	**Radiated emission**						
	(3m*)(±dB)				**(1m*)(±dB)**		**(0.5m*)(±dB)**
	9kHz -30MHz	30MHz -300MHz	300MHz -1GHz	1GHz -10GHz	10GHz -18GHz	18GHz -26.5GHz	26.5GHz -40GHz
No.1	4.3dB	5.5dB	6.3dB	5.5dB	5.8dB	5.8dB	4.3dB
No.2	4.2dB	5.4dB	6.3dB	5.4dB	5.7dB	5.9dB	5.6dB
No.3	4.4dB	5.4dB	6.4dB	5.2dB	5.5dB	5.8dB	5.5dB
No.4	4.7dB	5.6dB	6.4dB	5.3dB	5.7dB	5.9dB	5.5dB

*3m/1m/0.5m = Measurement distance

Power meter (±dB)	
Below 1GHz	Above 1GHz
0.7dB	1.5dB

Antenna terminal conducted emission and Power density (±dB)			**Antenna terminal conducted emission (±dB)**		**Channel power (±dB)**
Below 1GHz	1GHz-3GHz	3GHz-18GHz	18GHz-26.5GHz	26.5GHz-40GHz	
1.5dB	1.7dB	2.8dB	2.8dB	2.9dB	2.6dB

Radiated emission test(3m)
The data listed in this report meets the limits unless the uncertainty is taken into consideration.

3.5 Test Location

UL Japan, Inc. Ise EMC Lab. *NVLAP Lab. code: 200572-0
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8999 Facsimile : +81 596 24 8124

	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	2973C-1	19.2 x 11.2 x 7.7m	7.0 x 6.0m	No.1 Power source room
No.2 semi-anechoic chamber	2973C-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	2973C-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.3 Preparation room
No.3 shielded room	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	2973C-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.4 Preparation room
No.4 shielded room	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 semi-anechoic chamber	-	6.0 x 6.0 x 3.9m	6.0 x 6.0m	-
No.6 shielded room	-	4.0 x 4.5 x 2.7m	4.0 x 4.5 m	-
No.6 measurement room	-	4.75 x 5.4 x 3.0m	4.75 x 4.15 m	-
No.7 shielded room	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.8 measurement room	-	3.1 x 5.0 x 2.7m	N/A	-
No.9 measurement room	-	8.0 x 4.6 x 2.8m	2.4 x 2.4m	-
No.11 measurement room	-	6.2 x 4.7 x 3.0m	4.8 x 4.6m	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

SECTION 4: Operation of E.U.T. during testing

4.1 Operating Mode(s)

Bluetooth (BT): Transmitting (Tx), Payload: PRBS9
Inquiry

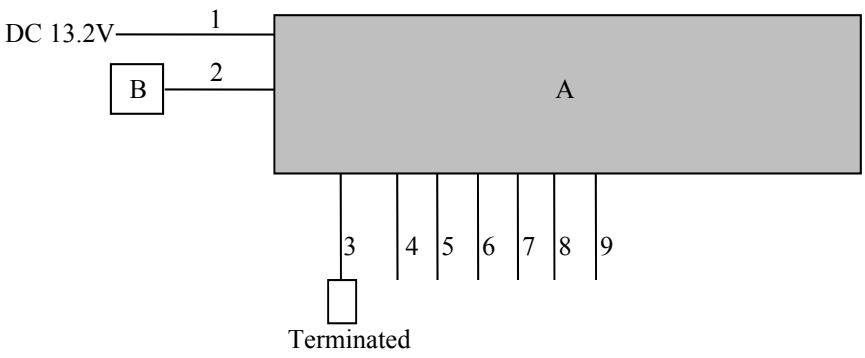
Details of Operating Mode(s)

Test Item	Mode	Tested frequency
Spurious Emission (Conducted/Radiated)	Tx (Hopping off) DH5, 3DH5	2402MHz 2441MHz 2480MHz
Carrier Frequency Separation	Tx (Hopping on) DH5, 3DH5 Inquiry	2402MHz 2441MHz 2480MHz
20dB Bandwidth	Tx (Hopping off) DH5, 3DH5 Inquiry	2402MHz 2441MHz 2480MHz
Number of Hopping Frequency	Tx (Hopping on) DH5, 3DH5 Inquiry	-
Dwell time	Tx (Hopping on), -DH1, DH3, DH5 -3DH1, 3DH3, 3DH5 Inquiry	-
Maximum Peak Output Power	Tx (Hopping off) DH5, 2DH5, 3DH5 Inquiry	2402MHz 2441MHz 2480MHz
Band Edge Compliance (Conducted)	Tx DH5, 3DH5 -Hopping on -Hopping off	2402MHz 2480MHz
99% Occupied Bandwidth	Tx DH5, 3DH5 -Hopping on -Hopping off Inquiry	2402MHz 2441MHz 2480MHz

*As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload length (except Dwell time test)
*2DH mode (2Mb/s EDR: pi/4DQPSK) was excluded for other tests than power measurement by using 3DH mode (3 Mb/s EDR: 8DPSK) as a representative.

*EUT has the power settings by the software as follows;
Power settings: 255 50 (default)
Software: Bluetest 3
*This setting of software is the worst case.
Any conditions under the normal use do not exceed the condition of setting.
In addition, end users cannot change the settings of the output power of the product.

4.2 Configuration and peripherals



* Cabling and setup(s) were taken into consideration and test data was taken under worse case conditions.
* The testing was performed with DC 13.2 V only.
The voltage which the car battery mounted in the car outputs was selected as a test voltage according to the customer's request.
As the stable voltage (DC 3.3 V) is provided to RF module via the internal regulator, it does not influence on the test result.

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Car Audio	RV-1M	SP-8205-1	MITSUBISHI ELECTRIC CORPORATION SANDA WORKS	EUT
B	USB Memory	RUF2-JV4GS-WH	120301	BUFFALO	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Cable	3.0	Unshielded	Unshielded	-
2	USB Cable	2.0	Shielded	Shielded	-
3	FM Cable	0.5	Unshielded	Unshielded	-
4	HDMI Cable	2.0	Shielded	Shielded	-
5	Signal Cable	2.0	Unshielded	Unshielded	-
6	Signal Cable	4.0	Unshielded	Unshielded	-
7	Signal Cable	0.5	Unshielded	Unshielded	-
8	Signal Cable	2.0	Unshielded	Unshielded	-
9	Signal Cable	2.0	Unshielded	Unshielded	-

SECTION 5: Radiated Spurious Emission

Test Procedure
EUT was placed on a urethane platform of nominal size, 1.0m by 1.5m, raised 0.8m above the conducting ground plane.
The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.
The height of the measuring antenna varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength.
The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer.
The measurements were made with the following detector function of the test receiver and the Spectrum analyzer (in linear mode).
The test was made with the detector (RBW/VBW) in the following table.
When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

Test Antennas are used as below;

Frequency	30MHz to 300MHz	300MHz to 1GHz	Above 1GHz
Antenna Type	Biconical	Logperiodic	Horn

In any 100kHz bandwidth outside the restricted band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

20dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9 (IC) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (IC).

Frequency	Below 1GHz	Above 1GHz		20dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV	PK
IF Bandwidth	BW 120kHz	RBW: 1MHz VBW: 3MHz	RBW: 1MHz VBW: 10Hz *1)	RBW: 100kHz VBW: 300kHz
Test Distance	3m	3m (below 10GHz), 1m*2) (above 10GHz)		3m (below 10GHz), 1m*2) (above 10GHz)

*1) Although 00-705 accepts VBW=10Hz for AV measurements, it was confirmed that superfluous smoothing was not performed.
*2) Distance Factor: 20 x log (3.0m/1.0m) = 9.5dB

The test was made on EUT at the normal use position.

The test results and limit are rounded off to one decimal place, so some differences might be observed.

Measurement range : 30M-26.5GHz
Test data : APPENDIX
Test result : Pass

SECTION 6: Antenna Terminal Conducted Tests

Test Procedure

The tests were made with below setting connected to the antenna port.

Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument used
20dB Bandwidth	3MHz	30kHz	100kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth *1)	Enough width to display emission skirts	1 to 5% of OBW	Three times of RBW	Auto	Peak	Max Hold	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak Average *3)	-	Power Meter (Sensor: 50MHz BW)
Carrier Frequency Separation	5MHz or 3MHz	100kHz or 30kHz	300kHz or 100kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Number of Hopping Frequency	30MHz	300kHz	1MHz	Auto	Peak	Max Hold	Spectrum Analyzer
Dwell Time	Zero Span	100kHz, 1MHz	300kHz, 3MHz	As necessary capture the entire dwell time per hopping channel	Peak	Clear Write	Spectrum Analyzer
Conducted Spurious Emission *2)	9kHz to 150kHz	200Hz	620Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150kHz to 30MHz	9.1kHz	27kHz				
	30MHz to 25GHz (Less or equal to 5GHz)	100kHz	300kHz				
Conducted Spurious Emission Band Edge compliance	10MHz	100kHz	300kHz	Auto	Peak	Max Hold	Spectrum Analyzer

*1) Peak hold was applied as Worst-case measurement.
*2) In the frequency range below 30MHz, RBW was narrowed to separate the noise contents.
Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart.(9kHz-150kHz:RBW=200Hz, 150kHz-30MHz:RBW=9.1kHz)
*3) Reference data

The test results and limit are rounded off to two decimals place, so some differences might be observed.

Test data : APPENDIX
Test result : Pass

APPENDIX 1: Test data

20dB Bandwidth and Carrier Frequency Separation

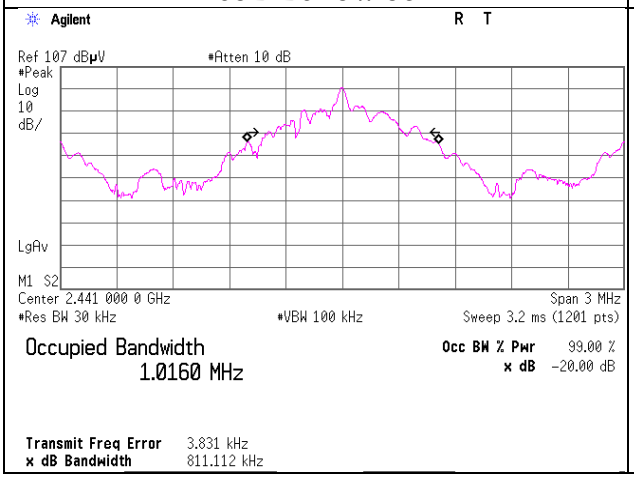
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10762685H
Date	04/21/2015
Temperature/ Humidity	25deg. C / 38% RH
Engineer	Kazuya Yoshioka
Mode	Tx (Hopping on/off) DH5/3DH5/Inquiry

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.930	1.000	>= 0.620
DH5	2441.0	0.931	1.000	>= 0.621
DH5	2480.0	0.940	1.000	>= 0.626
3DH5	2402.0	1.265	1.000	>= 0.843
3DH5	2441.0	1.261	1.000	>= 0.841
3DH5	2480.0	1.298	1.000	>= 0.865
Inquiry	2441.0	0.811	2.000	>= 0.541

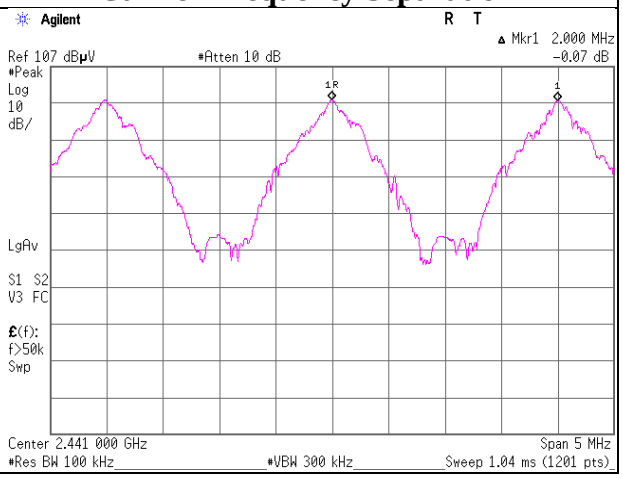
Limit: Two-thirds of 20dB Bandwidth or 25kHz (whichever is greater).
No limit applies to 20dB Bandwidth.

Inquiry

20dB Bandwidth



Carrier Frequency Separation

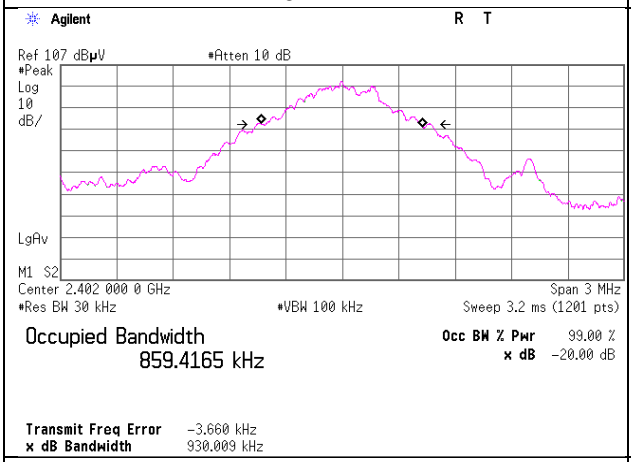


20dB Bandwidth and Carrier Frequency Separation

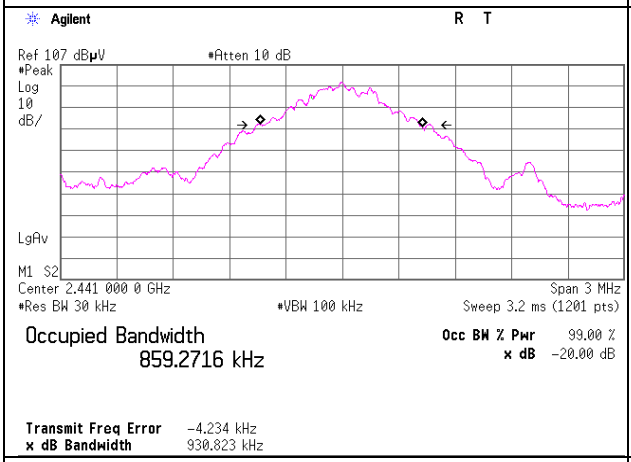
Tx DH5

20dB Bandwidth

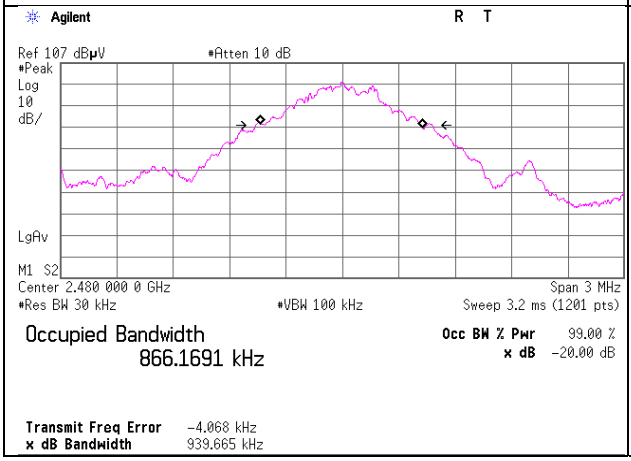
2402MHz



2441MHz

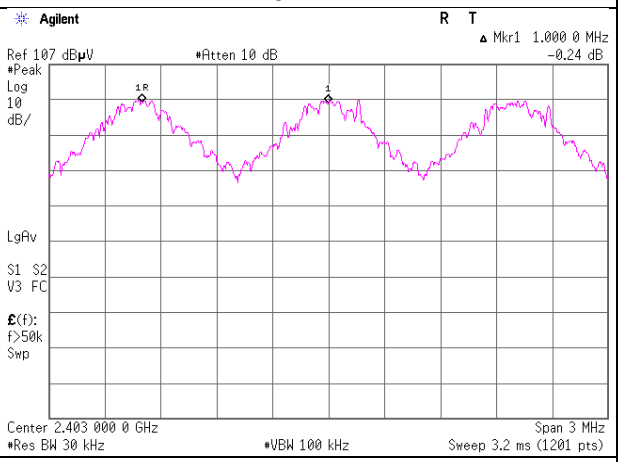


2480MHz



Carrier Frequency Separation

2402MHz



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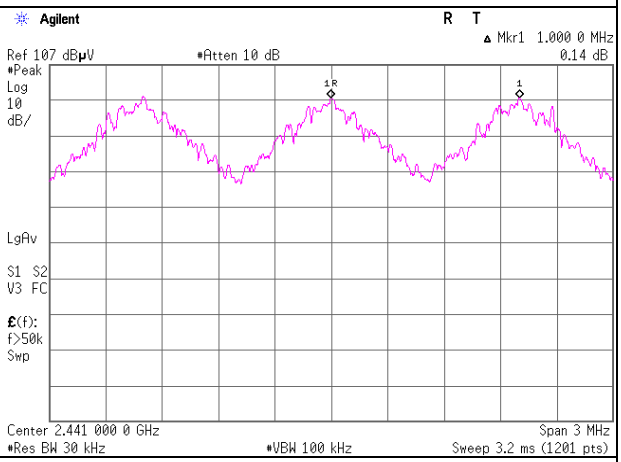
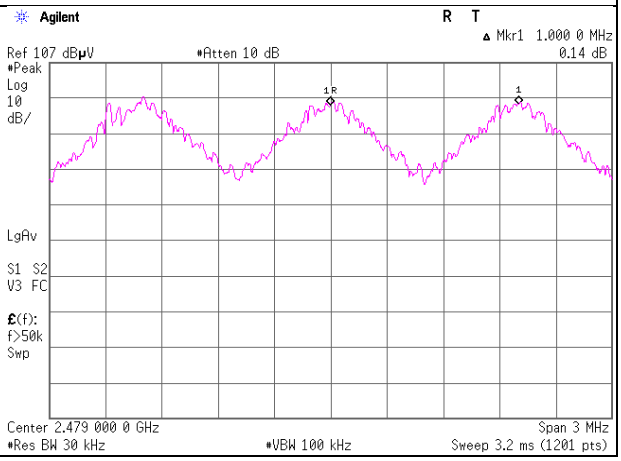


2480MHz

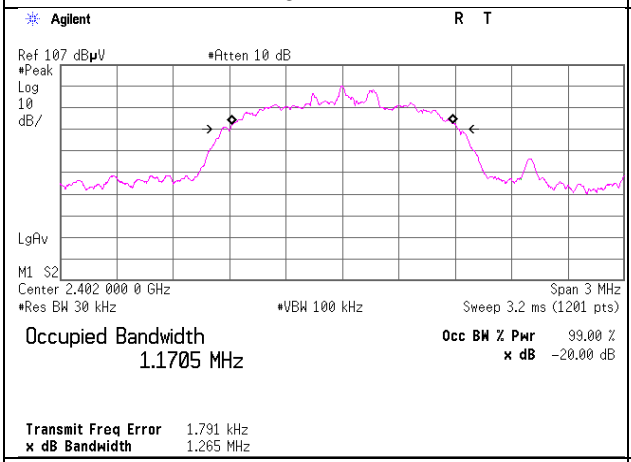


20dB Bandwidth and Carrier Frequency Separation

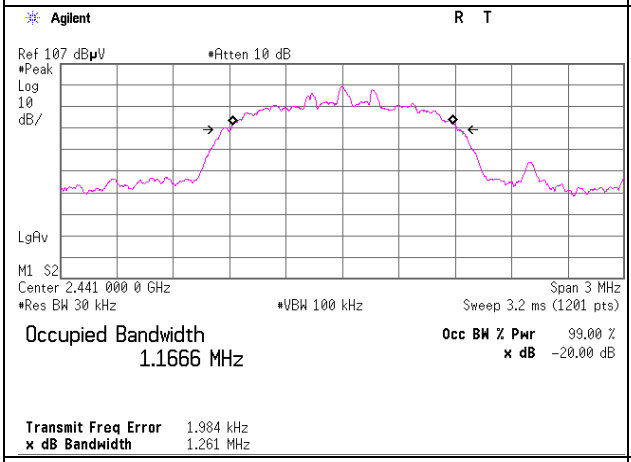
Tx 3DH5

20dB Bandwidth

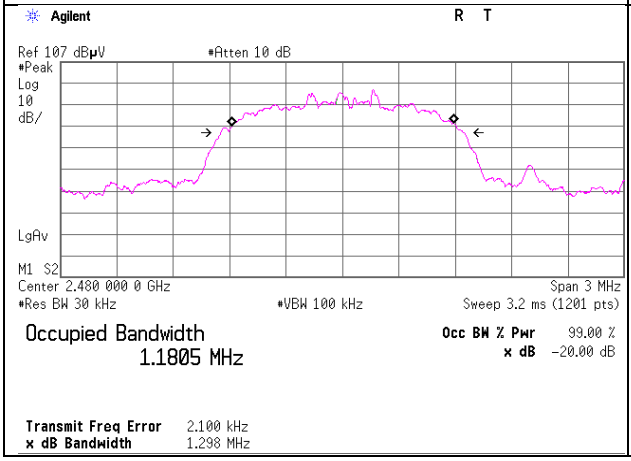
2402MHz



2441MHz

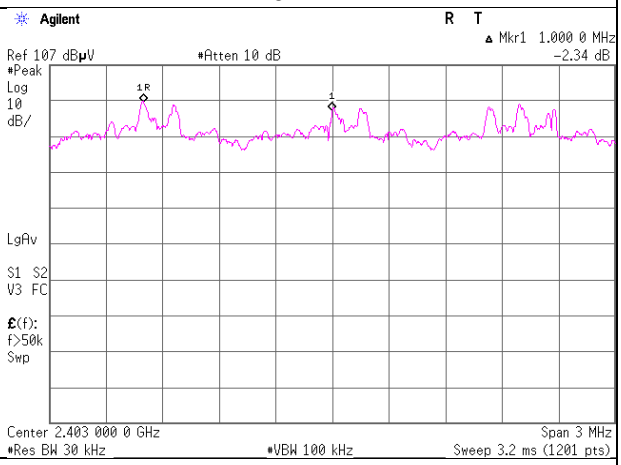


2480MHz

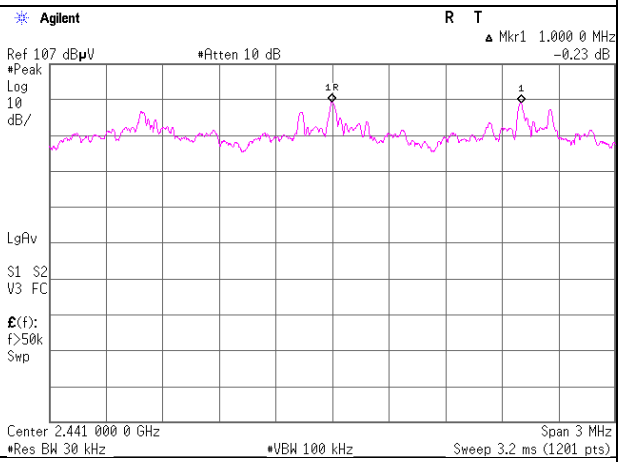


Carrier Frequency Separation

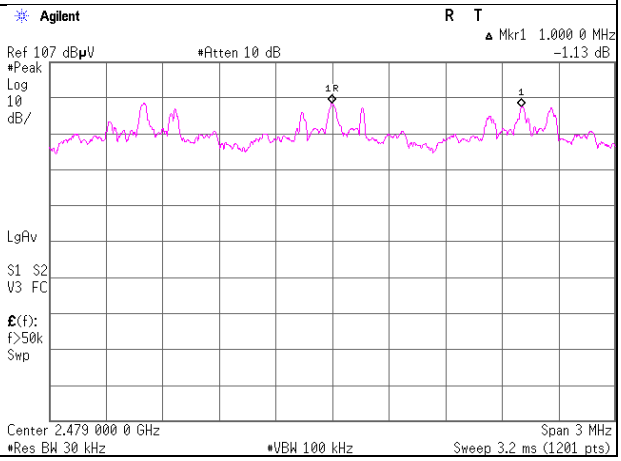
2402MHz



2441MHz



2480MHz



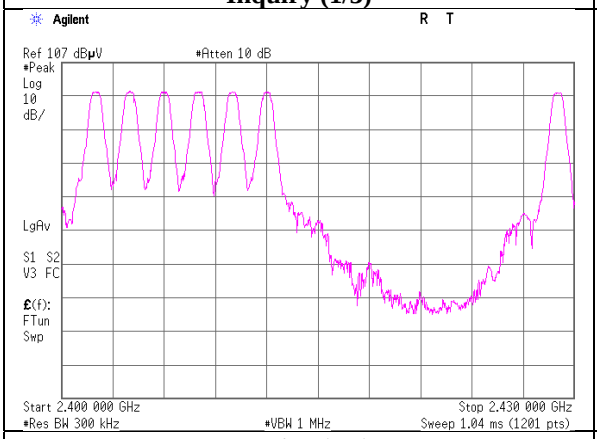
Number of Hopping Frequency

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10762685H
Date	04/21/2015
Temperature/ Humidity	25deg. C / 38% RH
Engineer	Kazuya Yoshioka
Mode	Tx (Hopping on) DH5/3DH5/Inquiry

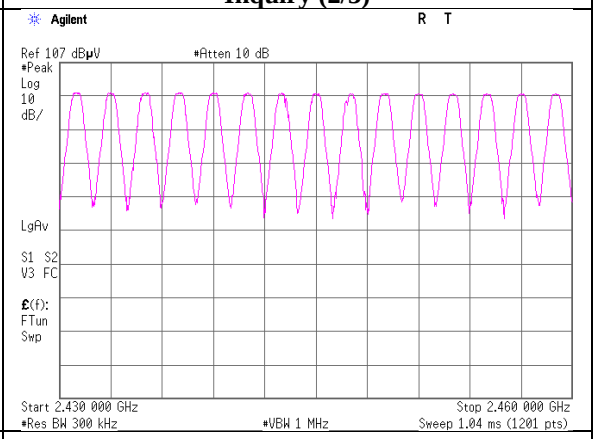
Mode	Number of channel [times]	Limit [times]
DH5	79	>= 15
3DH5	79	>= 15
Inquiry	32	>= 15

Test was not performed at AFH mode whose number of hopping channel is 20 channels because this Bluetooth radio is in compliance of Bluetooth Specification.

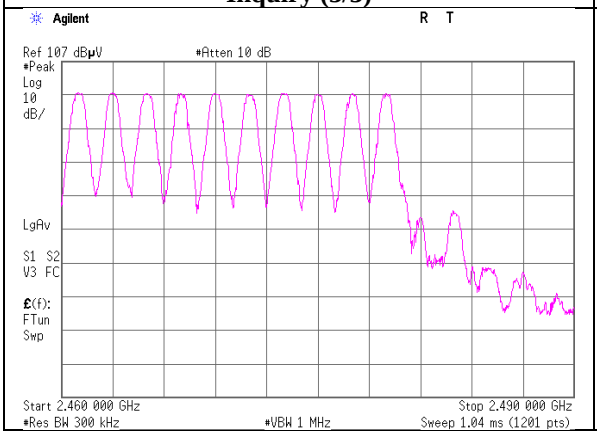
Inquiry (1/3)



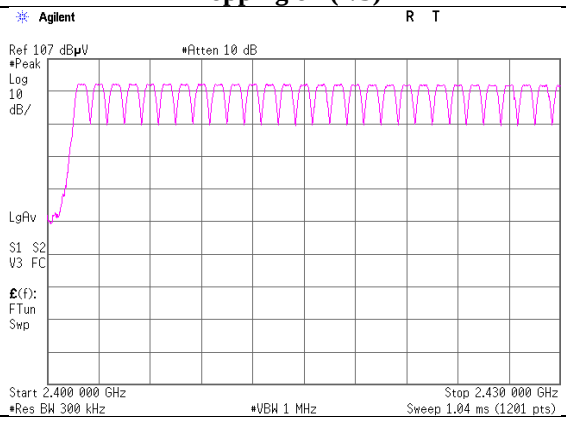
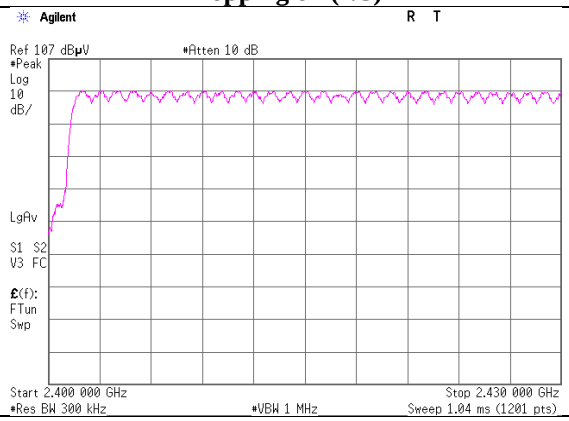
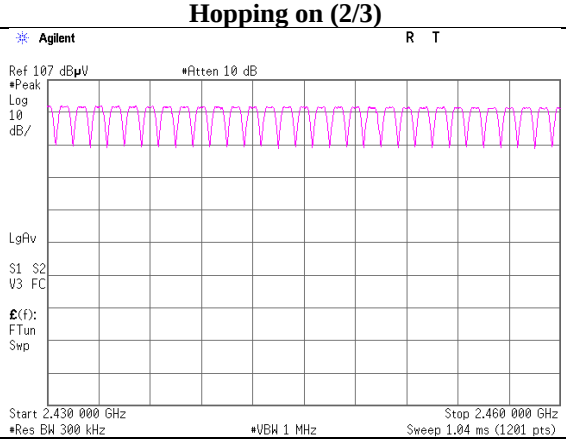
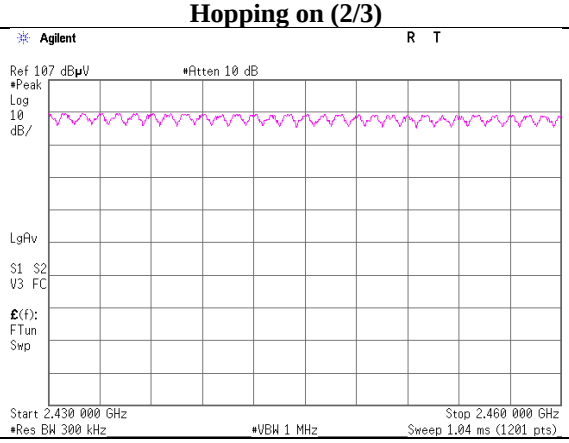
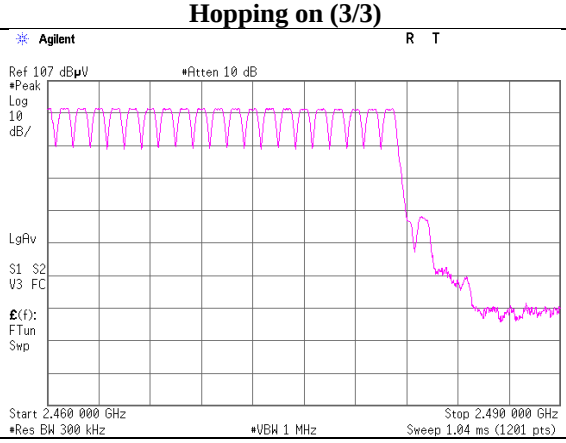
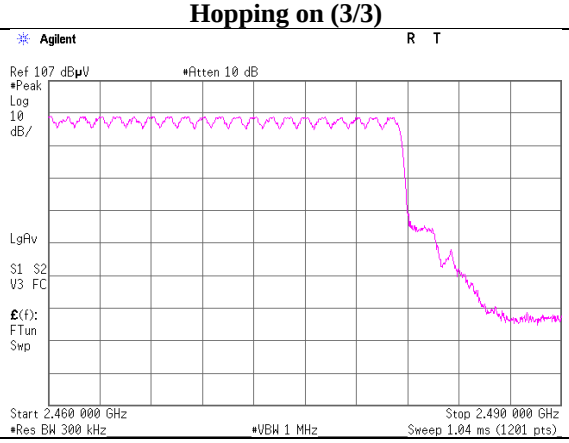
Inquiry (2/3)



Inquiry (3/3)



Number of Hopping Frequency

Tx DH5	Tx 3DH5
Hopping on (1/3)	**Hopping on (1/3)**
	
Hopping on (2/3)	**Hopping on (2/3)**
	
Hopping on (3/3)	**Hopping on (3/3)**
	

Dwell time

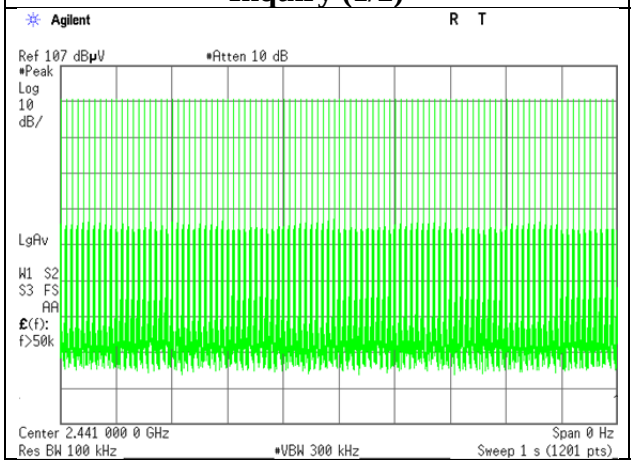
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10762685H
Date	04/21/2015
Temperature/ Humidity	25deg. C / 38% RH
Engineer	Kazuya Yoshioka
Mode	Tx (Hopping on) DH5/3DH5/Inquiry

Mode	Number of transmission in a 31.6(79 Hopping x 0.4) / 12.8(32 Hopping x 0.4)second period	Length of transmission time [msec]	Result [msec]	Limit [msec]
DH1	51.0 times / 5 sec. x 31.6 sec. = 323 times	0.522	169	400
DH3	26.0 times / 5 sec. x 31.6 sec. = 165 times	1.788	295	400
DH5	17.0 times / 5 sec. x 31.6 sec. = 108 times	3.047	329	400
3DH1	51.0 times / 5 sec. x 31.6 sec. = 323 times	0.535	173	400
3DH3	26.0 times / 5 sec. x 31.6 sec. = 165 times	1.792	296	400
3DH5	17.0 times / 5 sec. x 31.6 sec. = 108 times	3.053	330	400
Inquiry	100.0 times / 1 sec. x 12.8 sec. = 1280 times	0.215	275	400

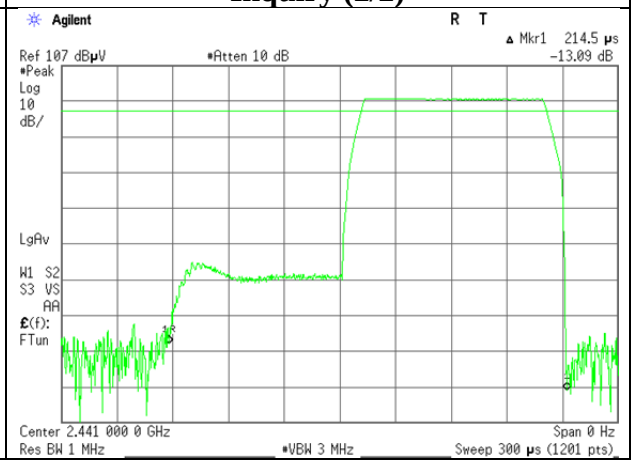
Sample Calculation
Result = Number of transmission x Length of transmition time

This device complies with the Bluetooth protocol for FHSS operation, employing a pseudo random channel selection and hopping rate to ensure that the occupancy time in N x 0.4s, where N is the number of channels being used in the hopping sequence (20 ≤ N ≤ 79), is always less than 0.4s regardless of packet size. This is confirmed in the test report for N=79.

Inquiry (1/2)

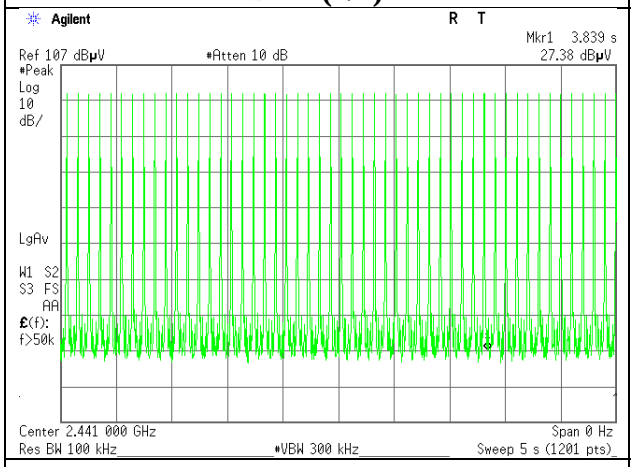


Inquiry (2/2)

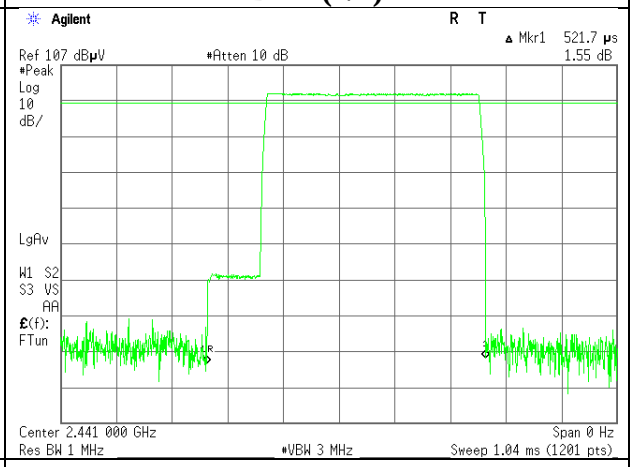


Dwell time

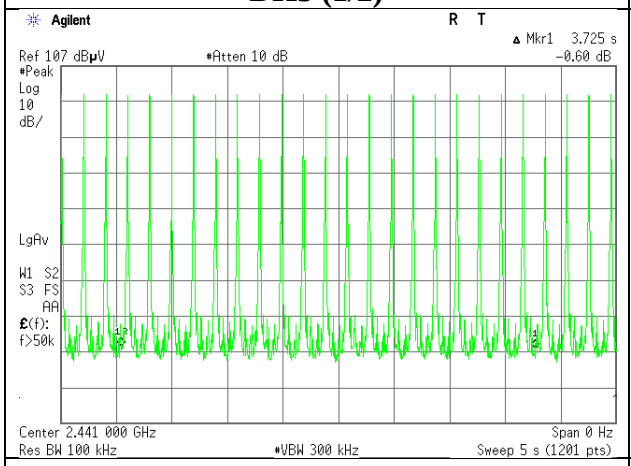
DH1 (1/2)



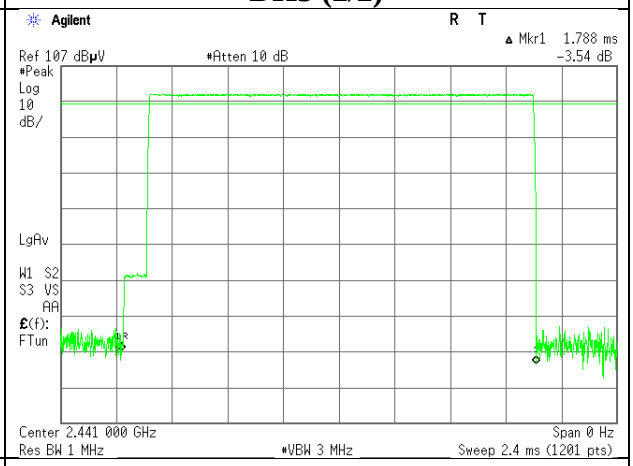
DH1 (2/2)



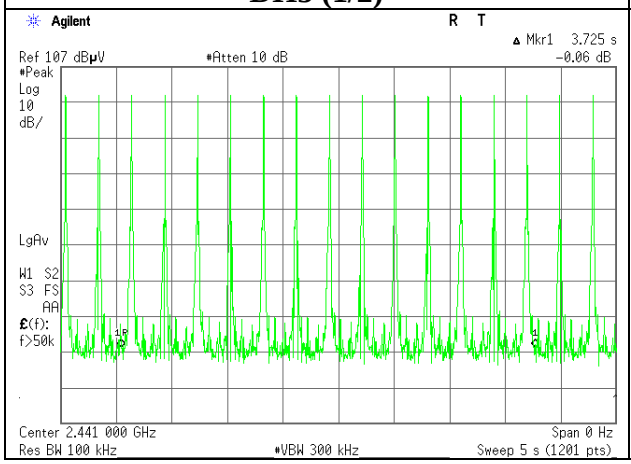
DH3 (1/2)



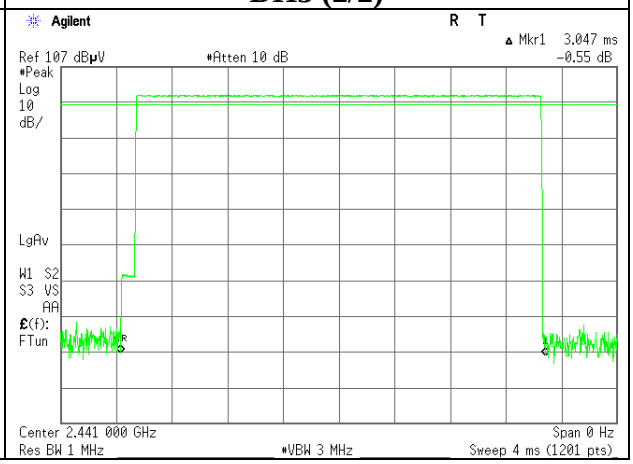
DH3 (2/2)



DH5 (1/2)

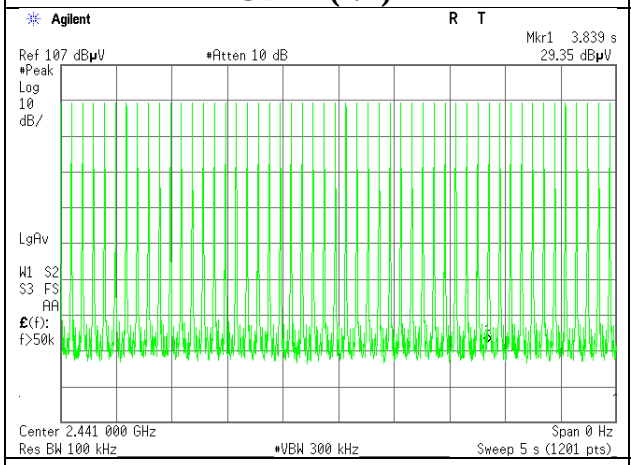


DH5 (2/2)

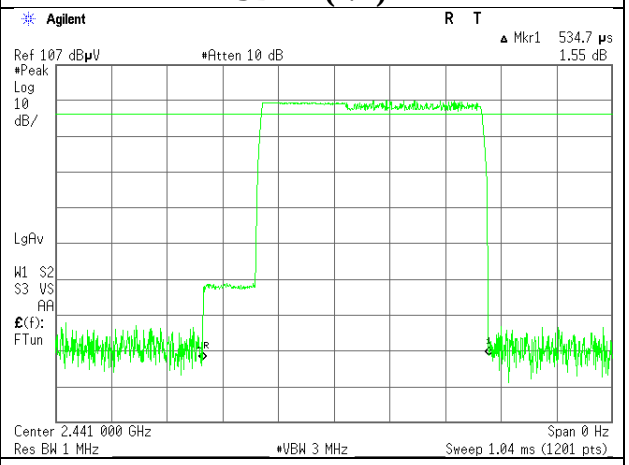


Dwell time

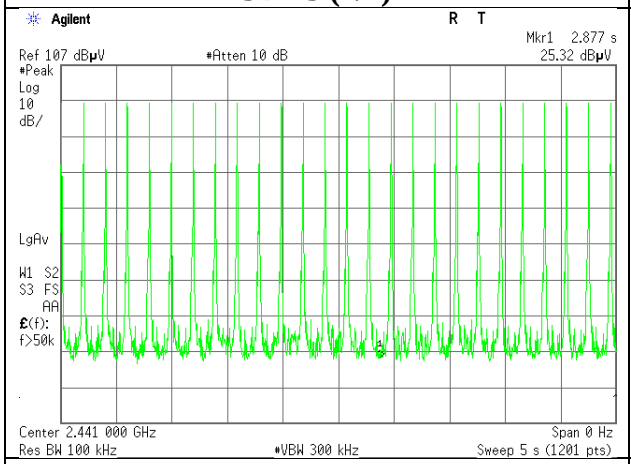
3DH1 (1/2)



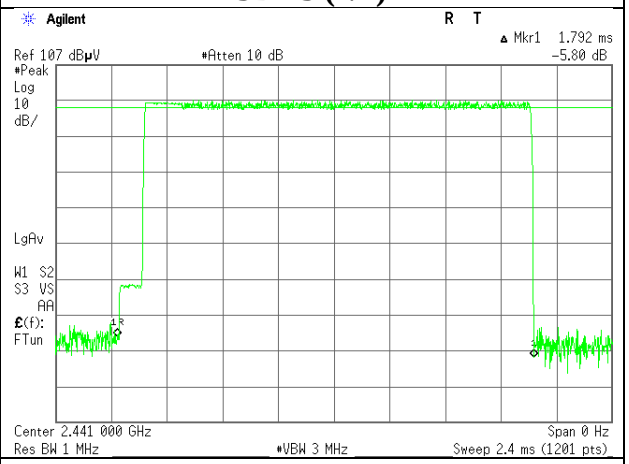
3DH1 (2/2)



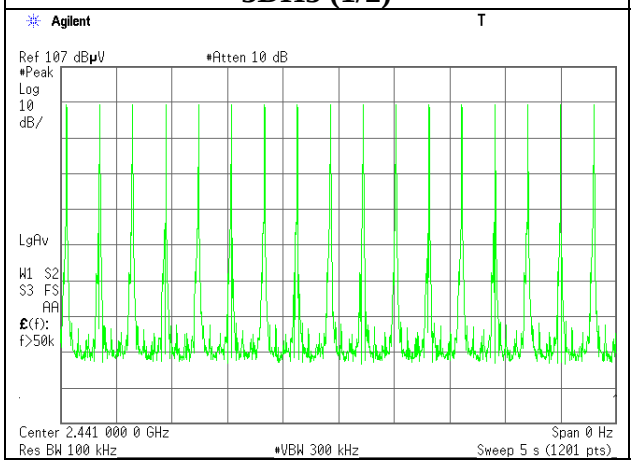
3DH3 (1/2)



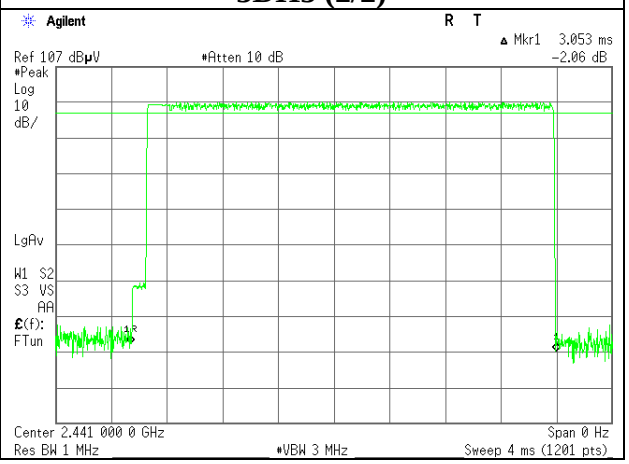
3DH3 (2/2)



3DH5 (1/2)



3DH5 (2/2)



Maximum Peak Output Power

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10762685H
Date	04/21/2015
Temperature/ Humidity	25deg. C / 38% RH
Engineer	Kazuya Yoshioka
Mode	Tx (Hopping off) DH5/2DH5/3DH5/Inquiry

Mode	Freq.	Reading	Cable Loss	Atten.	Result		Limit		Margin
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
DH5	2402	-7.43	1.89	10.06	4.52	2.83	20.96	125	16.44
DH5	2441	-7.76	1.89	10.06	4.19	2.62	20.96	125	16.77
DH5	2480	-8.20	1.89	10.06	3.75	2.37	20.96	125	17.21
2DH5	2402	-8.83	1.89	10.06	3.12	2.05	20.96	125	17.84
2DH5	2441	-9.47	1.89	10.06	2.48	1.77	20.96	125	18.48
2DH5	2480	-10.20	1.89	10.06	1.75	1.50	20.96	125	19.21
3DH5	2402	-8.69	1.89	10.06	3.26	2.12	20.96	125	17.70
3DH5	2441	-9.38	1.89	10.06	2.57	1.81	20.96	125	18.39
3DH5	2480	-10.07	1.89	10.06	1.88	1.54	20.96	125	19.08
Inquiry	2441	-8.82	1.89	10.06	3.13	2.06	20.96	125	17.83

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied)+ Attenuator Loss

Test was not performed at AFH mode, because the decrease of number of channel (min: 20ch) at AFH mode does not influence on the output power and bandwidth of the EUT.
As this device had AFH mode and frequency separation could not meet the requirement of over 20dB BW without 2/3 relaxation, 125mW power limit was applied to it.

Average Output Power
(Reference data for SAR testing)

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10762685H
Date	04/21/2015
Temperature/ Humidity	25deg. C / 38% RH
Engineer	Kazuya Yoshioka
Mode	Tx (Hopping off) DH5/2DH5/3DH5

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Antenna Gain [dBi]	Result (Cond.) [dBm]	Result (Cond.) [mW]	Result (e.i.r.p) [dBm]	Result (e.i.r.p) [mW]
DH5	2402	-8.85	1.89	10.06	2.00	3.10	2.04	5.10	3.24
DH5	2441	-9.14	1.89	10.06	2.00	2.81	1.91	4.81	3.03
DH5	2480	-9.63	1.89	10.06	2.00	2.32	1.71	4.32	2.70
2DH5	2402	-12.06	1.89	10.06	2.00	-0.11	0.97	1.89	1.55
2DH5	2441	-12.81	1.89	10.06	2.00	-0.86	0.82	1.14	1.30
2DH5	2480	-13.67	1.89	10.06	2.00	-1.72	0.67	0.28	1.07
3DH5	2402	-12.01	1.89	10.06	2.00	-0.06	0.99	1.94	1.56
3DH5	2441	-12.79	1.89	10.06	2.00	-0.84	0.82	1.16	1.31
3DH5	2480	-13.64	1.89	10.06	2.00	-1.69	0.68	0.31	1.07

Sample Calculation:
Result(Cond.) = Reading + Cable Loss (including the Cable(s) customer supplied) + Atten.Loss
Result(e.i.r.p.) = Reading + Cable Loss (including the Cable(s) customer supplied) + Atten.Loss + Antenna Gain

Radiated Spurious Emission

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber	
Report No.	10762685H	
Date	04/28/2015	04/29/2015
Temperature/ Humidity	23deg. C / 53% RH	24deg. C / 56% RH
Engineer	Shinichi Miyazono (1-10GHz)	Satofumi Matsuyama (Above 10GHz, Below 1GHz)
Mode	Tx, DH5 2402MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	33.335	QP	36.6	16.4	7.0	32.3	27.7	40.0	12.3	
Hori	173.309	QP	46.1	16.0	8.8	32.2	38.7	43.5	4.8	
Hori	433.339	QP	41.9	17.8	10.8	32.1	38.4	46.0	7.6	
Hori	567.166	QP	38.3	19.1	11.5	32.1	36.8	46.0	9.2	
Hori	766.680	QP	35.6	21.7	12.6	31.7	38.2	46.0	7.8	
Hori	833.348	QP	35.1	22.3	12.9	31.4	38.9	46.0	7.1	
Hori	1602.002	PK	52.3	25.5	2.6	33.1	47.3	73.9	26.6	
Hori	2390.000	PK	41.8	26.8	3.2	32.0	39.8	73.9	34.1	
Hori	4804.000	PK	51.8	30.6	5.2	31.3	56.3	73.9	17.6	
Hori	7206.000	PK	41.7	35.9	6.6	32.0	52.2	73.9	21.7	Floor Noise
Hori	9608.000	PK	41.7	38.4	7.0	32.4	54.7	73.9	19.2	Floor Noise
Hori	1602.002	AV	51.0	25.5	2.6	33.1	46.0	53.9	7.9	
Hori	2390.000	AV	31.3	26.8	3.2	32.0	29.3	53.9	24.6	
Hori	4804.000	AV	43.6	30.6	5.2	31.3	48.1	53.9	5.8	
Hori	7206.000	AV	28.3	35.9	6.6	32.0	38.8	53.9	15.1	Floor Noise
Hori	9608.000	AV	29.3	38.4	7.0	32.4	42.3	53.9	11.6	Floor Noise
Vert	33.334	QP	47.2	16.4	7.0	32.3	38.3	40.0	1.7	
Vert	60.003	QP	47.8	7.4	7.5	32.1	30.6	40.0	9.4	
Vert	173.304	QP	44.2	16.0	8.8	32.2	36.8	43.5	6.7	
Vert	433.343	QP	44.3	17.8	10.8	32.1	40.8	46.0	5.2	
Vert	500.012	QP	41.3	18.2	11.2	32.1	38.6	46.0	7.4	
Vert	566.679	QP	42.5	19.1	11.5	32.1	41.0	46.0	5.0	
Vert	633.342	QP	37.6	19.8	11.9	32.1	37.2	46.0	8.8	
Vert	1099.957	PK	54.1	24.3	2.2	34.3	46.3	73.9	27.6	
Vert	2390.000	PK	52.8	26.8	3.2	32.0	50.8	73.9	23.1	
Vert	4804.000	PK	50.9	30.6	5.2	31.3	55.4	73.9	18.5	
Vert	7206.000	PK	42.0	35.9	6.6	32.0	52.5	73.9	21.4	Floor Noise
Vert	9608.000	PK	43.0	38.4	7.0	32.4	56.0	73.9	17.9	Floor Noise
Vert	1099.957	AV	51.2	24.3	2.2	34.3	43.4	53.9	10.5	
Vert	2390.000	AV	42.1	26.8	3.2	32.0	40.1	53.9	13.8	
Vert	4804.000	AV	42.1	30.6	5.2	31.3	46.6	53.9	7.3	
Vert	7206.000	AV	29.8	35.9	6.6	32.0	40.3	53.9	13.6	Floor Noise
Vert	9608.000	AV	30.4	38.4	7.0	32.4	43.4	53.9	10.5	Floor Noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).
Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB

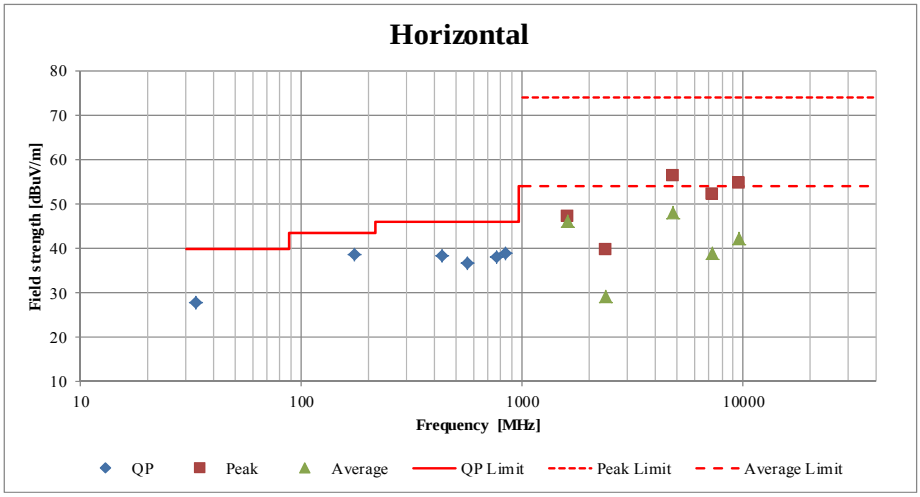
20dBc Data Sheet

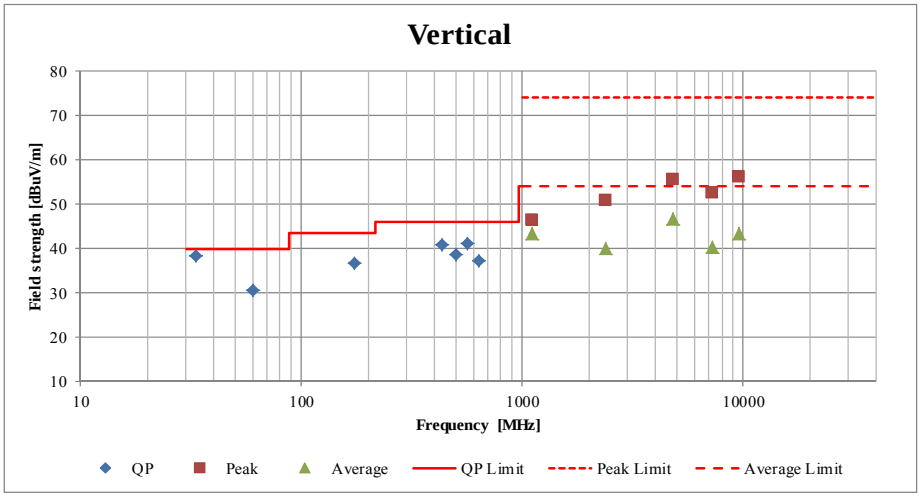
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hor	2402.000	PK	96.5	26.8	3.2	32.0	94.5	-	-	Carrier
Hor	2400.000	PK	61.3	26.8	3.2	32.0	59.3	74.5	15.2	
Ver	2402.000	PK	96.7	26.8	3.2	32.0	94.7	-	-	Carrier
Ver	2400.000	PK	59.2	26.8	3.2	32.0	57.2	74.7	17.5	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amprifier)

Radiated Spurious Emission
(Plot data, Worst case)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber	
Report No.	10762685H	
Date	04/28/2015	04/29/2015
Temperature/ Humidity	23deg. C / 53% RH	24deg. C / 56% RH
Engineer	Shinichi Miyazono (1-10GHz)	Satofumi Matsuyama (Above 10GHz, Below 1GHz)
Mode	Tx, DH5 2402MHz	





Radiated Spurious Emission

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	10762685H		
Date	04/28/2015	04/29/2015 Day	04/29/2015 Night
Temperature/ Humidity	23deg. C / 53% RH	24deg. C / 56% RH	24deg. C / 56% RH
Engineer	Shinichi Miyazono (1-10GHz)	Satofumi Matsuyama (Above 10GHz)	Shinichi Miyazono (Below 1GHz)
Mode	Tx, DH5 2441MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	33.338	QP	36.3	16.4	7.0	32.3	27.4	40.0	12.6	
Hori	173.312	QP	45.7	16.0	8.8	32.2	38.3	43.5	5.2	
Hori	433.340	QP	41.8	17.8	10.8	32.1	38.3	46.0	7.7	
Hori	566.683	QP	42.5	19.1	11.5	32.1	41.0	46.0	5.0	
Hori	766.684	QP	35.1	21.7	12.6	31.7	37.7	46.0	8.3	
Hori	833.354	QP	34.6	22.3	12.9	31.4	38.4	46.0	7.6	
Hori	1626.006	PK	54.8	25.6	2.7	33.1	50.0	73.9	23.9	
Hori	4882.000	PK	53.9	30.8	5.3	31.3	58.7	73.9	15.2	
Hori	7323.000	PK	41.6	35.9	6.5	32.0	52.0	73.9	21.9	Floor Noise
Hori	9764.000	PK	41.8	38.7	7.1	32.5	55.1	73.9	18.8	Floor Noise
Hori	1626.006	AV	50.6	25.6	2.7	33.1	45.8	53.9	8.1	
Hori	4882.000	AV	46.1	30.8	5.3	31.3	50.9	53.9	3.0	
Hori	7323.000	AV	29.7	35.9	6.5	32.0	40.1	53.9	13.8	Floor Noise
Hori	9764.000	AV	29.1	38.7	7.1	32.5	42.4	53.9	11.5	Floor Noise
Vert	33.338	QP	47.4	16.4	7.0	32.3	38.5	40.0	1.5	
Vert	60.018	QP	48.7	7.4	7.5	32.1	31.5	40.0	8.5	
Vert	173.324	QP	40.5	16.0	8.8	32.2	33.1	43.5	10.4	
Vert	433.344	QP	43.8	17.8	10.8	32.1	40.3	46.0	5.7	
Vert	500.012	QP	41.3	18.2	11.2	32.1	38.6	46.0	7.4	
Vert	566.677	QP	42.2	19.1	11.5	32.1	40.7	46.0	5.3	
Vert	633.345	QP	37.2	19.8	11.9	32.1	36.8	46.0	9.2	
Vert	1233.365	PK	52.4	24.7	2.3	34.0	45.4	73.9	28.5	
Vert	4882.000	PK	50.6	30.8	5.3	31.3	55.4	73.9	18.5	
Vert	7323.000	PK	42.1	35.9	6.5	32.0	52.5	73.9	21.4	Floor Noise
Vert	9764.000	PK	43.1	38.7	7.1	32.5	56.4	73.9	17.5	Floor Noise
Vert	1233.365	AV	48.9	24.7	2.3	34.0	41.9	53.9	12.0	
Vert	4882.000	AV	42.7	30.8	5.3	31.3	47.5	53.9	6.4	
Vert	7323.000	AV	29.6	35.9	6.5	32.0	40.0	53.9	13.9	Floor Noise
Vert	9764.000	AV	30.4	38.7	7.1	32.5	43.7	53.9	10.2	Floor Noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB

Radiated Spurious Emission

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	10762685H		
Date	04/28/2015	04/29/2015 Day	04/29/2015 Night
Temperature/ Humidity	23deg. C / 53% RH	24deg. C / 56% RH	24deg. C / 56% RH
Engineer	Shinichi Miyazono (1-10GHz)	Satofumi Matsuyama (Above 10GHz)	Shinichi Miyazono (Below 1GHz)
Mode	Tx, DH5 2480MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	33.335	QP	36.1	16.4	7.0	32.3	27.2	40.0	12.8	
Hori	173.322	QP	45.6	16.0	8.8	32.2	38.2	43.5	5.3	
Hori	433.346	QP	42.0	17.8	10.8	32.1	38.5	46.0	7.5	
Hori	566.680	QP	42.3	19.1	11.5	32.1	40.8	46.0	5.2	
Hori	766.684	QP	35.1	21.7	12.6	31.7	37.7	46.0	8.3	
Hori	833.352	QP	34.6	22.3	12.9	31.4	38.4	46.0	7.6	
Hori	1100.000	PK	51.5	24.3	2.2	34.3	43.7	73.9	30.2	
Hori	2483.500	PK	53.1	26.9	3.2	32.0	51.2	73.9	22.7	
Hori	4960.000	PK	51.6	30.9	5.2	31.2	56.5	73.9	17.4	
Hori	7440.000	PK	41.9	35.9	6.6	32.1	52.3	73.9	21.6	Floor Noise
Hori	9920.000	PK	43.8	38.9	7.1	32.5	57.3	73.9	16.6	Floor Noise
Hori	1100.000	AV	47.4	24.3	2.2	34.3	39.6	53.9	14.3	
Hori	2483.500	AV	43.4	26.9	3.2	32.0	41.5	53.9	12.4	
Hori	4960.000	AV	35.9	30.9	5.2	31.2	40.8	53.9	13.1	
Hori	7440.000	AV	29.5	35.9	6.6	32.1	39.9	53.9	14.0	Floor Noise
Hori	9920.000	AV	32.1	38.9	7.1	32.5	45.6	53.9	8.3	Floor Noise
Vert	33.335	QP	47.2	16.4	7.0	32.3	38.3	40.0	1.7	
Vert	60.018	QP	48.6	7.4	7.5	32.1	31.4	40.0	8.6	
Vert	173.332	QP	40.6	16.0	8.8	32.2	33.2	43.5	10.3	
Vert	433.340	QP	43.9	17.8	10.8	32.1	40.4	46.0	5.6	
Vert	500.010	QP	41.3	18.2	11.2	32.1	38.6	46.0	7.4	
Vert	566.684	QP	42.4	19.1	11.5	32.1	40.9	46.0	5.1	
Vert	633.345	QP	37.6	19.8	11.9	32.1	37.2	46.0	8.8	
Vert	1233.357	PK	52.7	24.7	2.3	34.0	45.7	73.9	28.2	
Vert	2483.500	PK	50.4	26.9	3.2	32.0	48.5	73.9	25.4	
Vert	4960.000	PK	47.3	30.9	5.2	31.2	52.2	73.9	21.7	
Vert	7440.000	PK	42.1	35.9	6.6	32.1	52.5	73.9	21.4	Floor Noise
Vert	9920.000	PK	43.0	38.9	7.1	32.5	56.5	73.9	17.4	Floor Noise
Vert	1233.357	AV	48.5	24.7	2.3	34.0	41.5	53.9	12.4	
Vert	2483.500	AV	41.0	26.9	3.2	32.0	39.1	53.9	14.8	
Vert	4960.000	AV	33.2	30.9	5.2	31.2	38.1	53.9	15.8	
Vert	7440.000	AV	29.9	35.9	6.6	32.1	40.3	53.9	13.6	Floor Noise
Vert	9920.000	AV	30.5	38.9	7.1	32.5	44.0	53.9	9.9	Floor Noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB

Radiated Spurious Emission

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber	
Report No.	10762685H	
Date	04/29/2015 Day	04/29/2015 Night
Temperature/ Humidity	24deg. C / 56% RH	24deg. C / 56% RH
Engineer	Satofumi Matsuyama (Above 1GHz)	Shinichi Miyazono (Below 1GHz)
Mode	Tx, 3DH5 2402MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	33.335	QP	36.7	16.4	7.0	32.3	27.8	40.0	12.2	
Hori	173.309	QP	45.6	16.0	8.8	32.2	38.2	43.5	5.3	
Hori	433.346	QP	42.0	17.8	10.8	32.1	38.5	46.0	7.5	
Hori	566.681	QP	42.3	19.1	11.5	32.1	40.8	46.0	5.2	
Hori	766.681	QP	35.0	21.7	12.6	31.7	37.6	46.0	8.4	
Hori	833.355	QP	34.6	22.3	12.9	31.4	38.4	46.0	7.6	
Hori	1600.050	PK	49.5	25.5	2.6	33.1	44.5	73.9	29.4	
Hori	2390.000	PK	44.8	26.8	3.2	32.0	42.8	73.9	31.1	
Hori	4804.000	PK	47.0	30.6	5.2	31.3	51.5	73.9	22.4	
Hori	7206.000	PK	40.5	35.9	6.6	32.0	51.0	73.9	22.9	Floor Noise
Hori	9608.000	PK	42.5	38.4	7.0	32.4	55.5	73.9	18.4	Floor Noise
Hori	1600.050	AV	42.9	25.5	2.6	33.1	37.9	53.9	16.0	
Hori	2390.000	AV	31.8	26.8	3.2	32.0	29.8	53.9	24.1	
Hori	4804.000	AV	33.5	30.6	5.2	31.3	38.0	53.9	15.9	
Hori	7206.000	AV	30.4	35.9	6.6	32.0	40.9	53.9	13.0	Floor Noise
Hori	9608.000	AV	31.0	38.4	7.0	32.4	44.0	53.9	9.9	Floor Noise
Vert	33.335	QP	47.1	16.4	7.0	32.3	38.2	40.0	1.8	
Vert	60.012	QP	48.5	7.4	7.5	32.1	31.3	40.0	8.7	
Vert	173.309	QP	43.6	16.0	8.8	32.2	36.2	43.5	7.3	
Vert	433.340	QP	43.9	17.8	10.8	32.1	40.4	46.0	5.6	
Vert	500.010	QP	41.3	18.2	11.2	32.1	38.6	46.0	7.4	
Vert	566.681	QP	42.1	19.1	11.5	32.1	40.6	46.0	5.4	
Vert	633.345	QP	37.8	19.8	11.9	32.1	37.4	46.0	8.6	
Vert	1233.393	PK	53.4	24.7	2.3	34.0	46.4	73.9	27.5	
Vert	2390.000	PK	44.0	26.8	3.2	32.0	42.0	73.9	31.9	
Vert	4804.000	PK	44.4	30.6	5.2	31.3	48.9	73.9	25.0	
Vert	7206.000	PK	40.6	35.9	6.6	32.0	51.1	73.9	22.8	Floor Noise
Vert	9608.000	PK	41.7	38.4	7.0	32.4	54.7	73.9	19.2	Floor Noise
Vert	1233.393	AV	50.3	24.7	2.3	34.0	43.3	53.9	10.6	
Vert	2390.000	AV	31.2	26.8	3.2	32.0	29.2	53.9	24.7	
Vert	4804.000	AV	31.8	30.6	5.2	31.3	36.3	53.9	17.6	
Vert	7206.000	AV	30.4	35.9	6.6	32.0	40.9	53.9	13.0	Floor Noise
Vert	9608.000	AV	31.0	38.4	7.0	32.4	44.0	53.9	9.9	Floor Noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).
Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2402.000	PK	97.8	26.8	3.2	32.0	95.8	-	-	Carrier
Hori	2400.000	PK	54.7	26.8	3.2	32.0	52.7	75.8	23.1	
Vert	2402.000	PK	95.5	26.8	3.2	32.0	93.5	-	-	Carrier
Vert	2400.000	PK	52.0	26.8	3.2	32.0	50.0	73.5	23.5	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amprifier)

Radiated Spurious Emission

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber	
Report No.	10762685H	
Date	04/29/2015 Day	04/29/2015 Night
Temperature/ Humidity	24deg. C / 56% RH	24deg. C / 56% RH
Engineer	Satofumi Matsuyama (Above 1GHz)	Shinichi Miyazono (Below 1GHz)
Mode	Tx, 3DH5 2441MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	33.335	QP	36.7	16.4	7.0	32.3	27.8	40.0	12.2	
Hori	173.313	QP	46.0	16.0	8.8	32.2	38.6	43.5	4.9	
Hori	433.345	QP	42.0	17.8	10.8	32.1	38.5	46.0	7.5	
Hori	566.681	QP	42.4	19.1	11.5	32.1	40.9	46.0	5.1	
Hori	766.685	QP	35.7	21.7	12.6	31.7	38.3	46.0	7.7	
Hori	833.349	QP	34.5	22.3	12.9	31.4	38.3	46.0	7.7	
Hori	1626.700	PK	55.3	25.6	2.7	33.1	50.5	73.9	23.4	
Hori	4882.000	PK	47.2	30.8	5.3	31.3	52.0	73.9	21.9	
Hori	7323.000	PK	40.4	35.9	6.5	32.0	50.8	73.9	23.1	Floor Noise
Hori	9764.000	PK	41.1	38.7	7.1	32.5	54.4	73.9	19.5	Floor Noise
Hori	1626.700	AV	51.7	25.6	2.7	33.1	46.9	53.9	7.0	
Hori	4882.000	AV	34.6	30.8	5.3	31.3	39.4	53.9	14.5	
Hori	7323.000	AV	30.3	35.9	6.5	32.0	40.7	53.9	13.2	Floor Noise
Hori	9764.000	AV	30.6	38.7	7.1	32.5	43.9	53.9	10.0	Floor Noise
Vert	33.335	QP	47.5	16.4	7.0	32.3	38.6	40.0	1.4	
Vert	60.012	QP	48.5	7.4	7.5	32.1	31.3	40.0	8.7	
Vert	173.313	QP	43.6	16.0	8.8	32.2	36.2	43.5	7.3	
Vert	433.341	QP	43.9	17.8	10.8	32.1	40.4	46.0	5.6	
Vert	500.004	QP	41.4	18.2	11.2	32.1	38.7	46.0	7.3	
Vert	566.675	QP	42.4	19.1	11.5	32.1	40.9	46.0	5.1	
Vert	633.351	QP	37.3	19.8	11.9	32.1	36.9	46.0	9.1	
Vert	1233.363	PK	52.8	24.7	2.3	34.0	45.8	73.9	28.1	
Vert	4882.000	PK	46.9	30.8	5.3	31.3	51.7	73.9	22.2	
Vert	7323.000	PK	40.7	35.9	6.5	32.0	51.1	73.9	22.8	Floor Noise
Vert	9764.000	PK	41.7	38.7	7.1	32.5	55.0	73.9	18.9	Floor Noise
Vert	1233.363	AV	49.7	24.7	2.3	34.0	42.7	53.9	11.2	
Vert	4882.000	AV	33.3	30.8	5.3	31.3	38.1	53.9	15.8	
Vert	7323.000	AV	30.3	35.9	6.5	32.0	40.7	53.9	13.2	Floor Noise
Vert	9764.000	AV	30.6	38.7	7.1	32.5	43.9	53.9	10.0	Floor Noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).
Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB

Radiated Spurious Emission

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber	
Report No.	10762685H	
Date	04/29/2015 Day	04/29/2015 Night
Temperature/ Humidity	24deg. C / 56% RH	24deg. C / 56% RH
Engineer	Satofumi Matsuyama (Above 1GHz)	Shinichi Miyazono (Below 1GHz)
Mode	Tx, 3DH5 2480MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	33.331	QP	36.2	16.4	7.0	32.3	27.3	40.0	12.7	
Hori	173.309	QP	45.3	16.0	8.8	32.2	37.9	43.5	5.6	
Hori	433.345	QP	41.8	17.8	10.8	32.1	38.3	46.0	7.7	
Hori	566.682	QP	42.4	19.1	11.5	32.1	40.9	46.0	5.1	
Hori	766.682	QP	35.0	21.7	12.6	31.7	37.6	46.0	8.4	
Hori	833.356	QP	35.4	22.3	12.9	31.4	39.2	46.0	6.8	
Hori	1652.667	PK	55.1	25.6	2.7	33.0	50.4	73.9	23.5	
Hori	2483.500	PK	48.7	26.9	3.2	32.0	46.8	73.9	27.1	
Hori	4960.000	PK	40.6	30.9	5.2	31.2	45.5	73.9	28.4	Floor Noise
Hori	7440.000	PK	41.2	35.9	6.6	32.1	51.6	73.9	22.3	Floor Noise
Hori	9920.000	PK	41.6	38.9	7.1	32.5	55.1	73.9	18.8	Floor Noise
Hori	1652.667	AV	50.9	25.6	2.7	33.0	46.2	53.9	7.7	
Hori	2483.500	AV	34.9	26.9	3.2	32.0	33.0	53.9	20.9	
Hori	4960.000	AV	29.6	30.9	5.2	31.2	34.5	53.9	19.4	Floor Noise
Hori	7440.000	AV	30.3	35.9	6.6	32.1	40.7	53.9	13.2	Floor Noise
Hori	9920.000	AV	30.8	38.9	7.1	32.5	44.3	53.9	9.6	Floor Noise
Vert	33.331	QP	46.8	16.4	7.0	32.3	37.9	40.0	2.1	
Vert	60.042	QP	49.0	7.4	7.5	32.1	31.8	40.0	8.2	
Vert	173.319	QP	41.5	16.0	8.8	32.2	34.1	43.5	9.4	
Vert	433.347	QP	43.5	17.8	10.8	32.1	40.0	46.0	6.0	
Vert	500.008	QP	41.4	18.2	11.2	32.1	38.7	46.0	7.3	
Vert	566.683	QP	42.4	19.1	11.5	32.1	40.9	46.0	5.1	
Vert	633.347	QP	37.4	19.8	11.9	32.1	37.0	46.0	9.0	
Vert	1233.404	PK	52.7	24.7	2.3	34.0	45.7	73.9	28.2	
Vert	2483.500	PK	46.6	26.9	3.2	32.0	44.7	73.9	29.2	
Vert	4960.000	PK	40.8	30.9	5.2	31.2	45.7	73.9	28.2	Floor Noise
Vert	7440.000	PK	41.5	35.9	6.6	32.1	51.9	73.9	22.0	Floor Noise
Vert	9920.000	PK	41.7	38.9	7.1	32.5	55.2	73.9	18.7	Floor Noise
Vert	1233.404	AV	49.4	24.7	2.3	34.0	42.4	53.9	11.5	
Vert	2483.500	AV	33.4	26.9	3.2	32.0	31.5	53.9	22.4	
Vert	4960.000	AV	29.6	30.9	5.2	31.2	34.5	53.9	19.4	Floor Noise
Vert	7440.000	AV	30.3	35.9	6.6	32.1	40.7	53.9	13.2	Floor Noise
Vert	9920.000	AV	30.8	38.9	7.1	32.5	44.3	53.9	9.6	Floor Noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

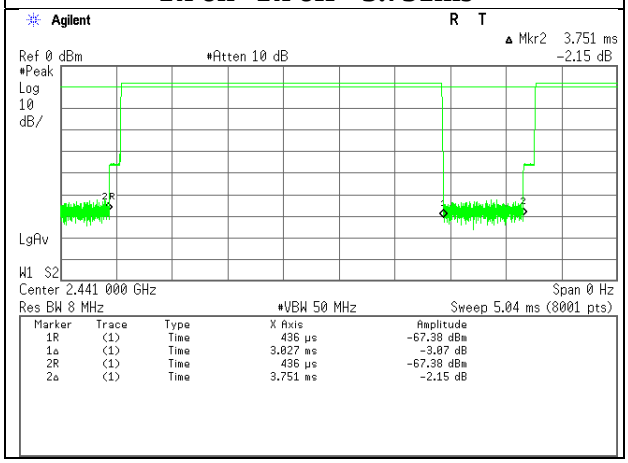
Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB

Duty Cycle

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10762685H
Date	04/21/2015
Temperature/ Humidity	25deg. C / 38% RH
Engineer	Kazuya Yoshioka
Mode	Tx (Hopping off) DH5/3DH5

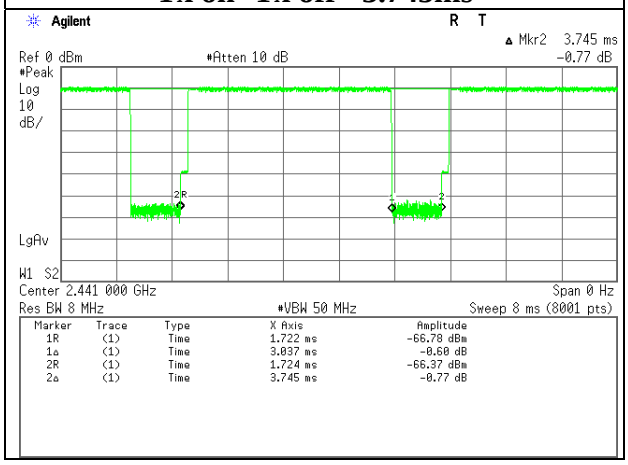
DH5

Tx on =3.027ms
Tx on+Tx off =3.751ms



3DH5

Tx on =3.037ms
Tx on+Tx off =3.745ms

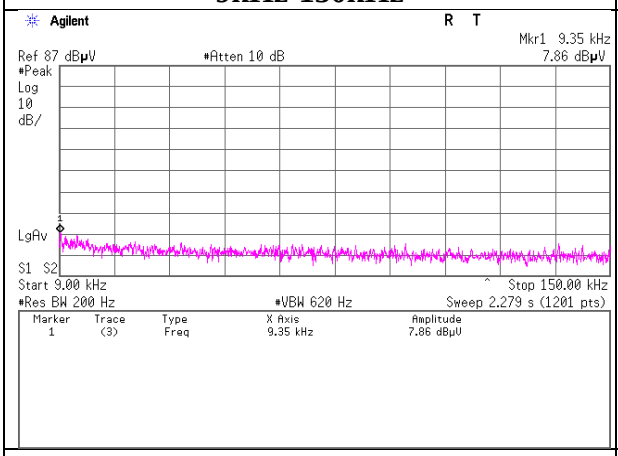


Conducted Spurious Emission

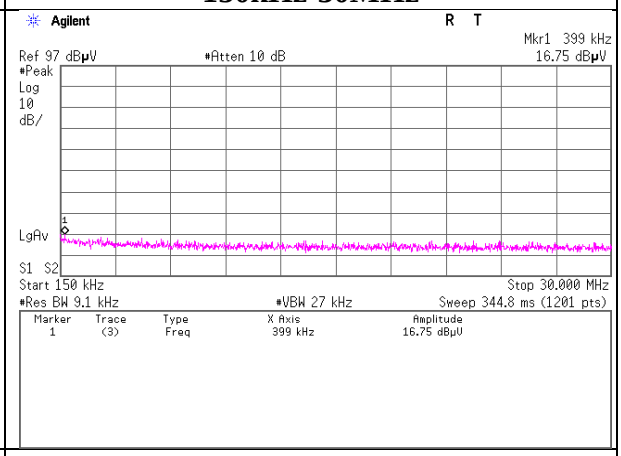
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10762685H
Date	04/21/2015
Temperature/ Humidity	25deg. C / 38% RH
Engineer	Kazuya Yoshioka
Mode	Tx (Hopping off) DH5

Tx DH5 2402MHz

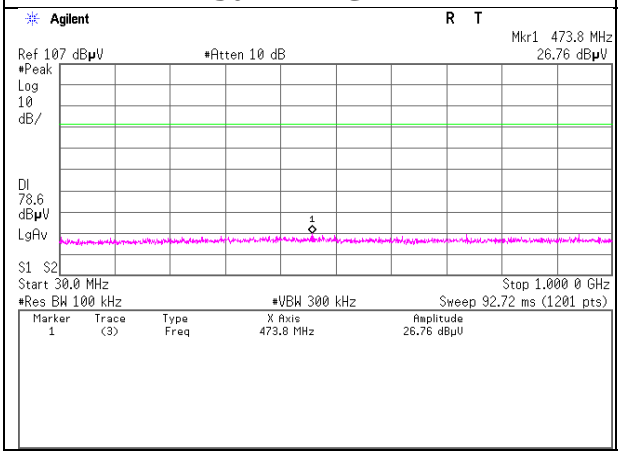
9kHz-150kHz



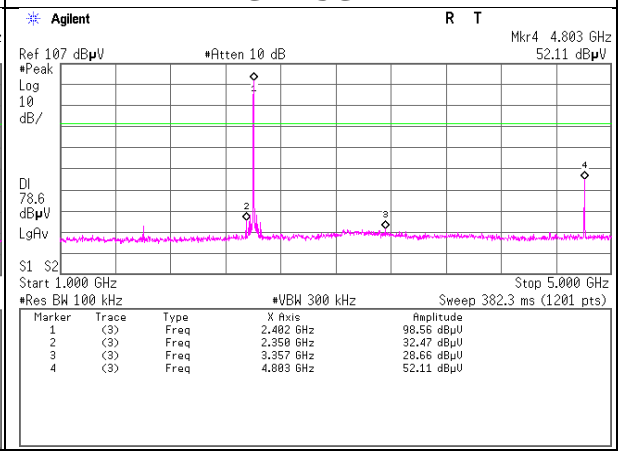
150kHz-30MHz



30MHz-1GHz



1GHz-5GHz

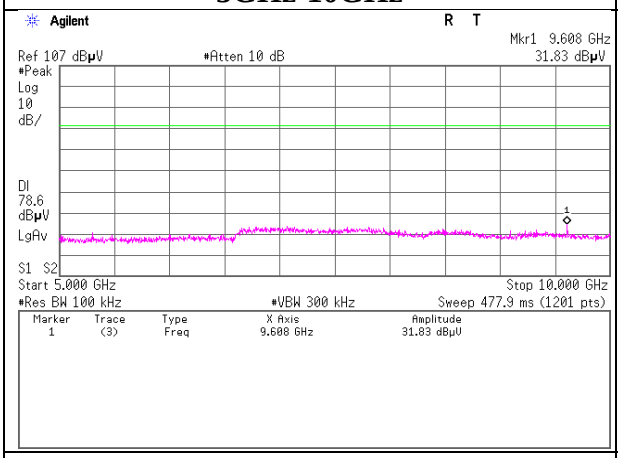


Conducted Spurious Emission

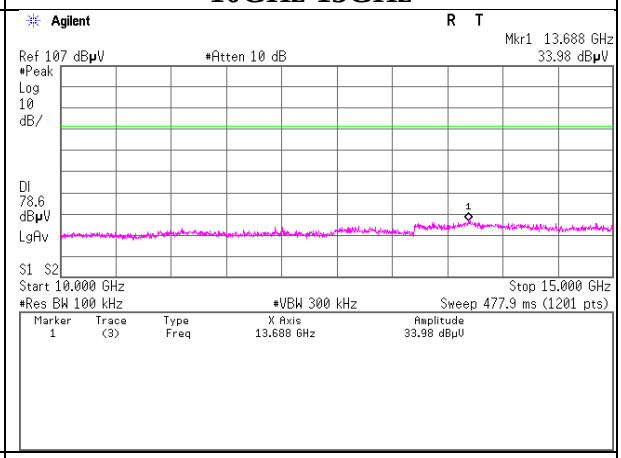
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10762685H
Date	04/21/2015
Temperature/ Humidity	25deg. C / 38% RH
Engineer	Kazuya Yoshioka
Mode	Tx (Hopping off) DH5

Tx DH5 2402MHz

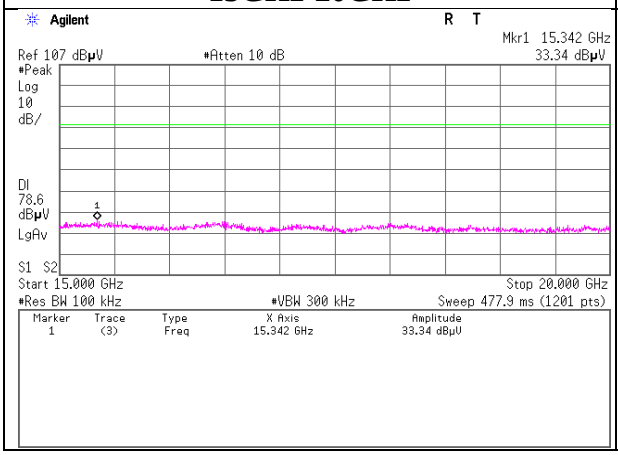
5GHz-10GHz



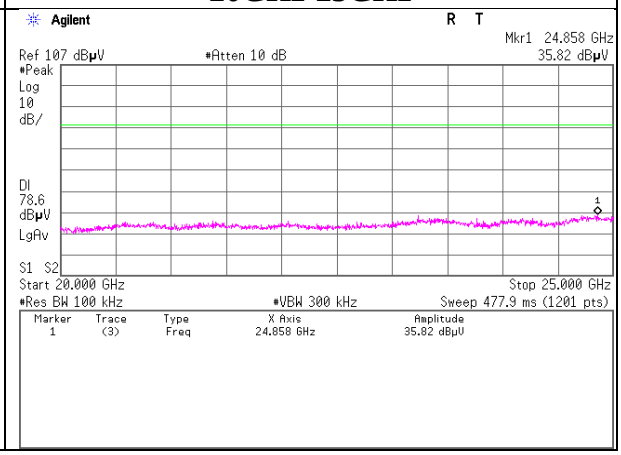
10GHz-15GHz



15GHz-20GHz



20GHz-25GHz

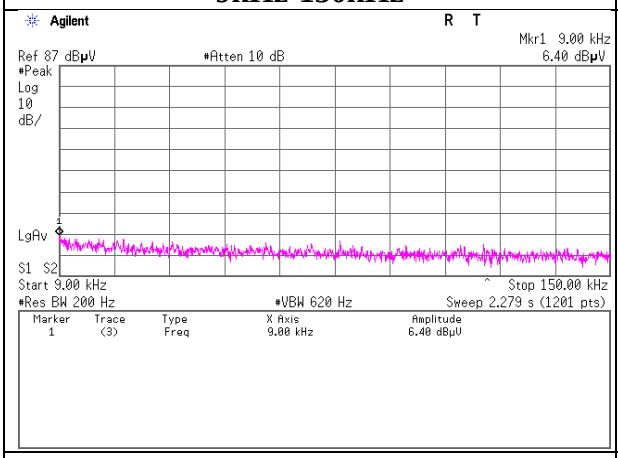


Conducted Spurious Emission

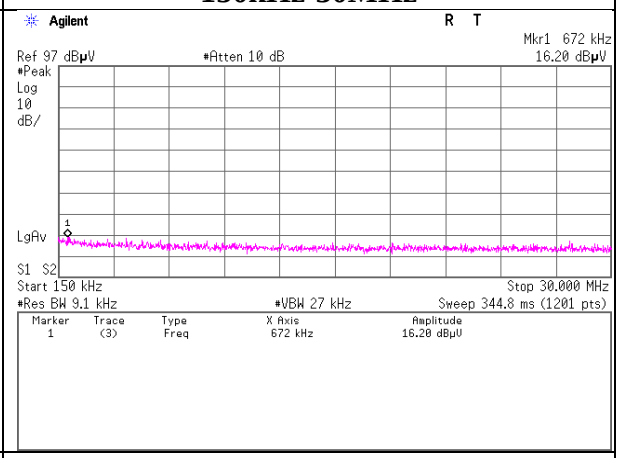
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10762685H
Date	04/21/2015
Temperature/ Humidity	25deg. C / 38% RH
Engineer	Kazuya Yoshioka
Mode	Tx (Hopping off) DH5

Tx DH5 2441MHz

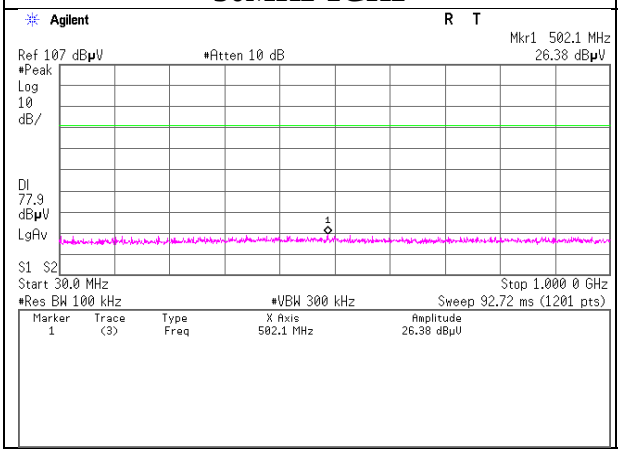
9kHz-150kHz



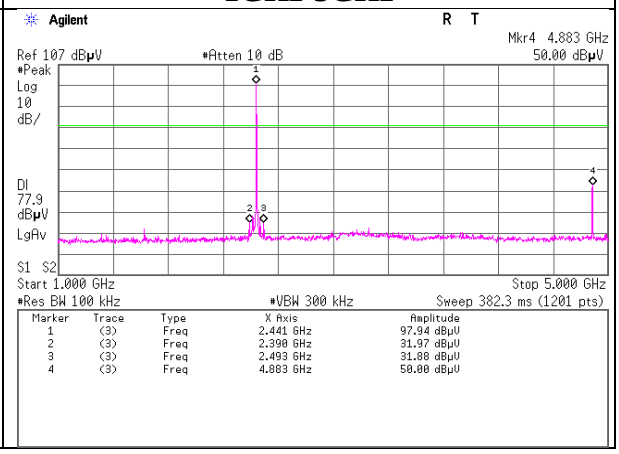
150kHz-30MHz



30MHz-1GHz



1GHz-5GHz

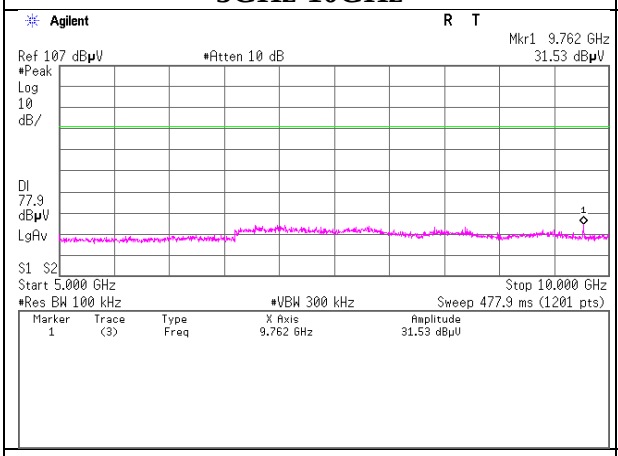


Conducted Spurious Emission

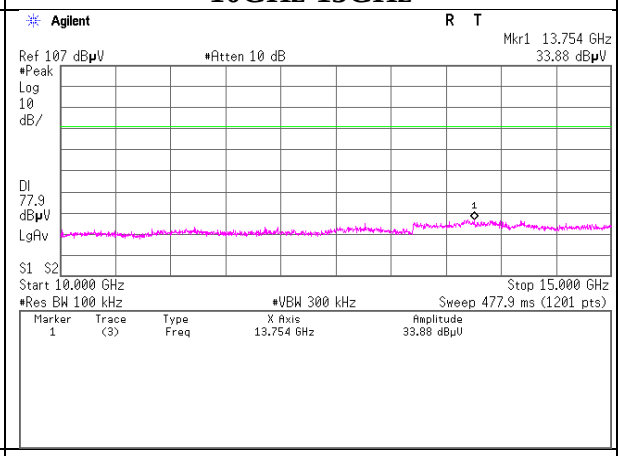
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10762685H
Date	04/21/2015
Temperature/ Humidity	25deg. C / 38% RH
Engineer	Kazuya Yoshioka
Mode	Tx (Hopping off) DH5

Tx DH5 2441MHz

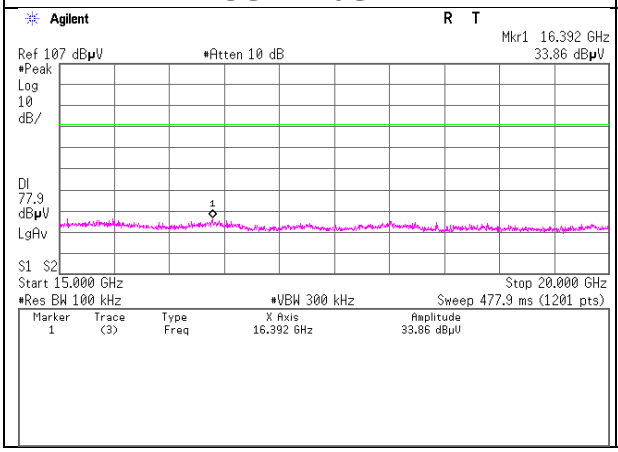
5GHz-10GHz



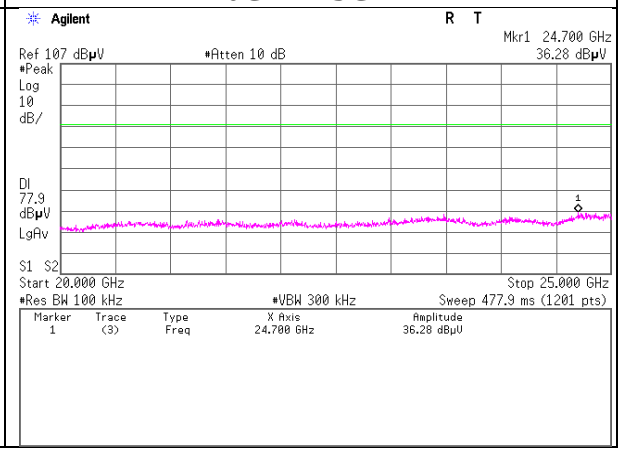
10GHz-15GHz



15GHz-20GHz



20GHz-25GHz

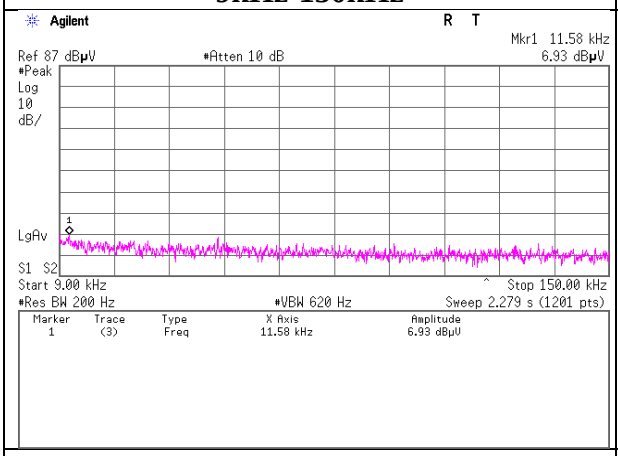


Conducted Spurious Emission

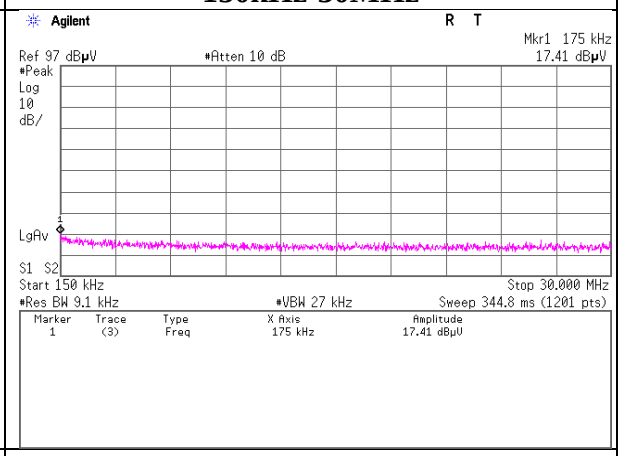
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10762685H
Date	04/21/2015
Temperature/ Humidity	25deg. C / 38% RH
Engineer	Kazuya Yoshioka
Mode	Tx (Hopping off) DH5

Tx DH5 2480MHz

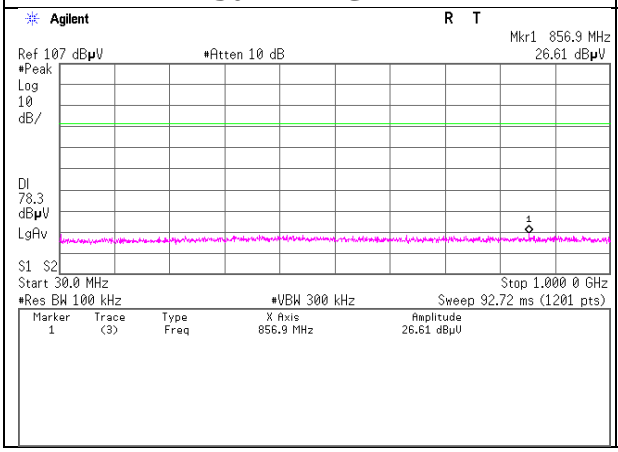
9kHz-150kHz



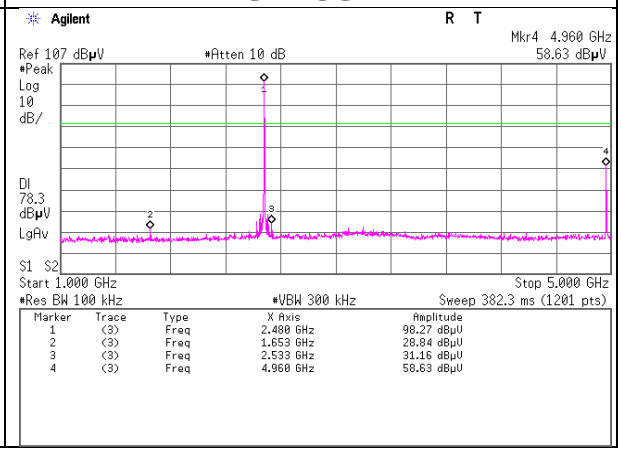
150kHz-30MHz



30MHz-1GHz



1GHz-5GHz

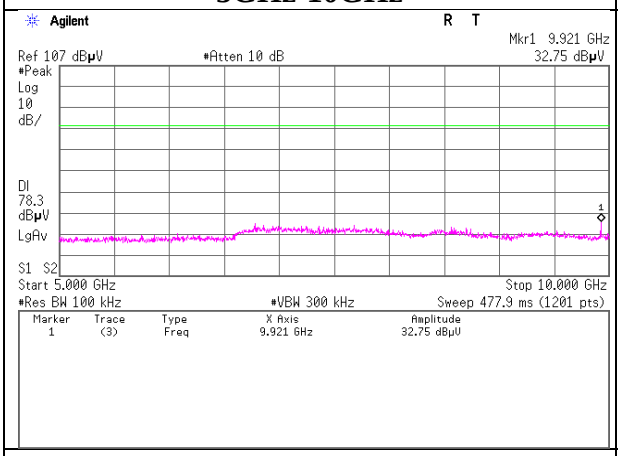


Conducted Spurious Emission

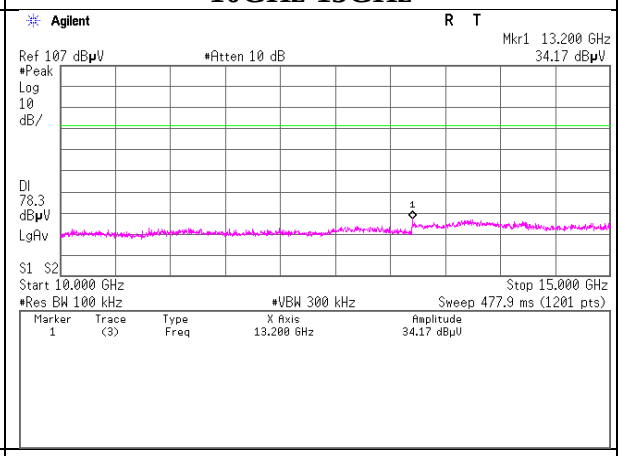
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10762685H
Date	04/21/2015
Temperature/ Humidity	25deg. C / 38% RH
Engineer	Kazuya Yoshioka
Mode	Tx (Hopping off) DH5

Tx DH5 2480MHz

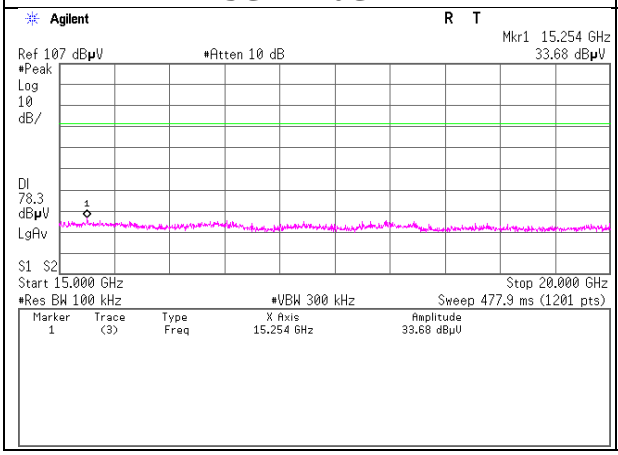
5GHz-10GHz



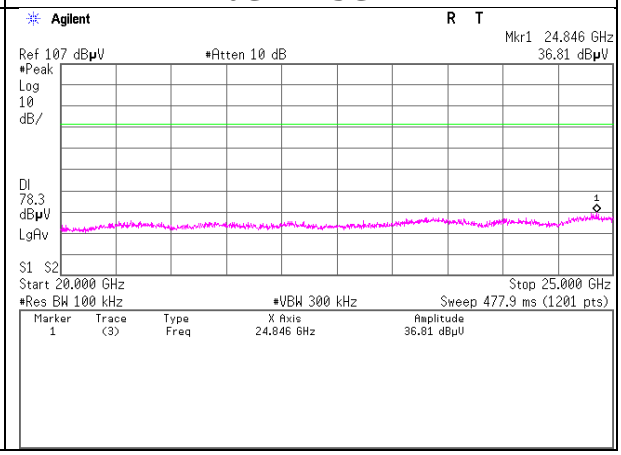
10GHz-15GHz



15GHz-20GHz



20GHz-25GHz

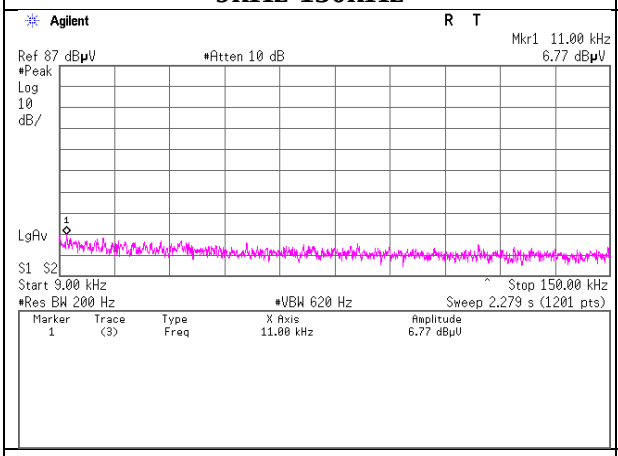


Conducted Spurious Emission

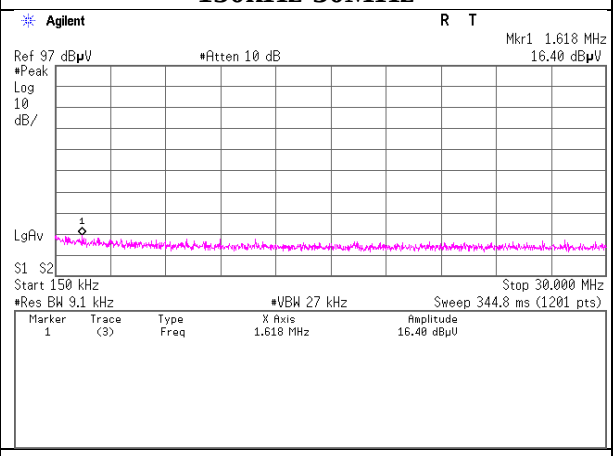
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10762685H
Date	04/21/2015
Temperature/ Humidity	25deg. C / 38% RH
Engineer	Kazuya Yoshioka
Mode	Tx (Hopping off) 3DH5

Tx 3DH5 2402MHz

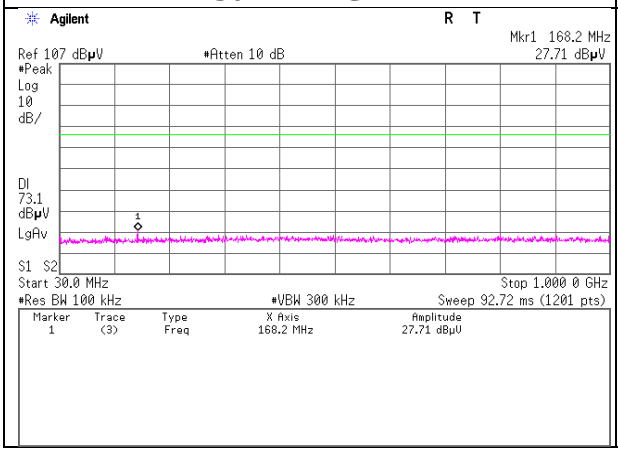
9kHz-150kHz



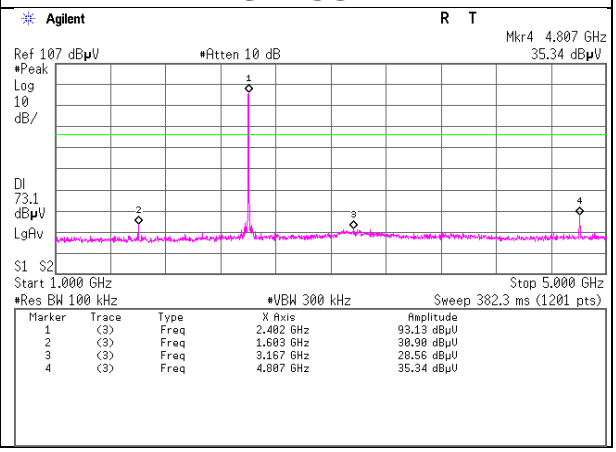
150kHz-30MHz



30MHz-1GHz



1GHz-5GHz

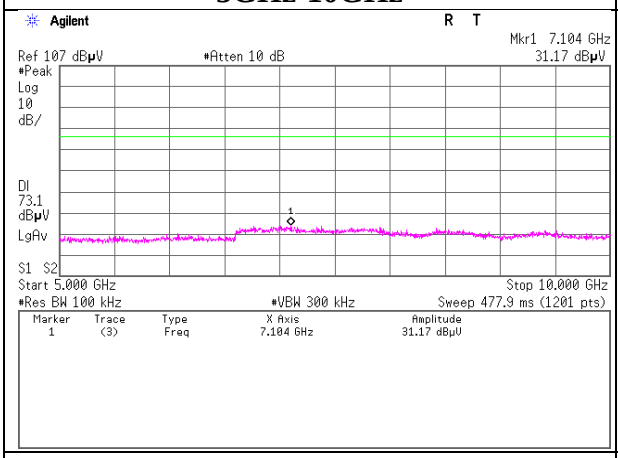


Conducted Spurious Emission

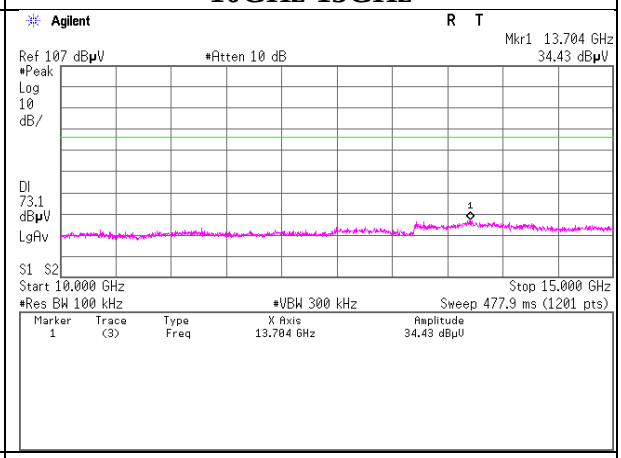
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10762685H
Date	04/21/2015
Temperature/ Humidity	25deg. C / 38% RH
Engineer	Kazuya Yoshioka
Mode	Tx (Hopping off) 3DH5

Tx 3DH5 2402MHz

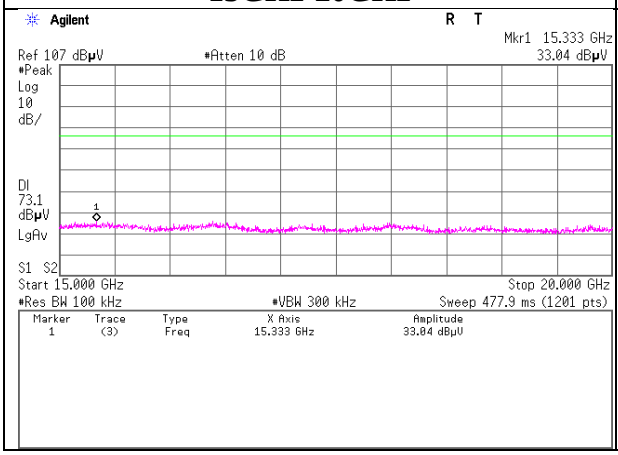
5GHz-10GHz



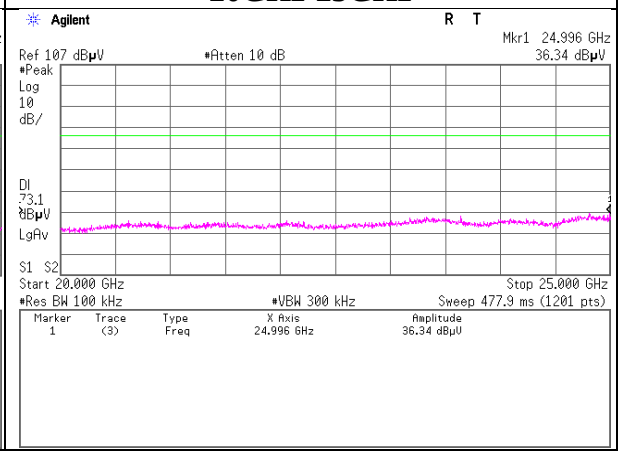
10GHz-15GHz



15GHz-20GHz



20GHz-25GHz

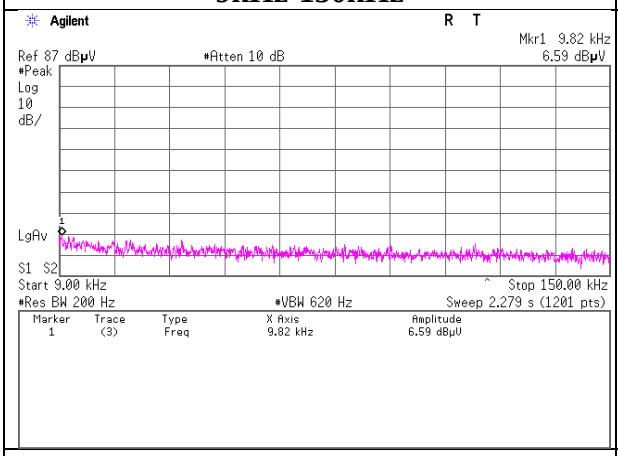


Conducted Spurious Emission

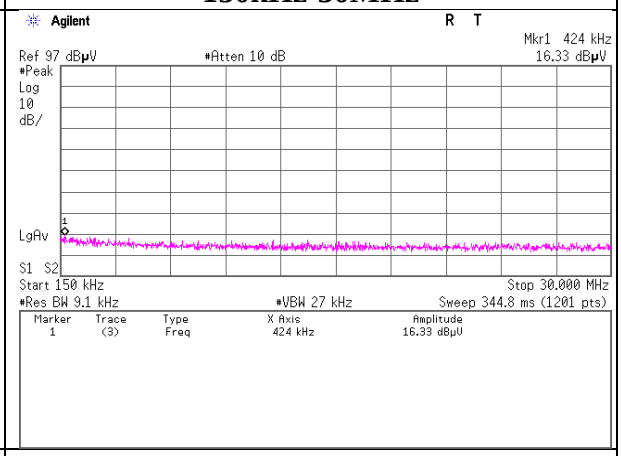
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10762685H
Date	04/21/2015
Temperature/ Humidity	25deg. C / 38% RH
Engineer	Kazuya Yoshioka
Mode	Tx (Hopping off) 3DH5

Tx 3DH5 2441MHz

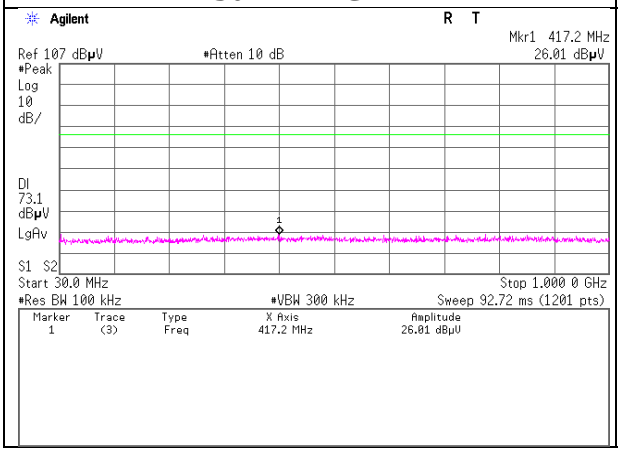
9kHz-150kHz



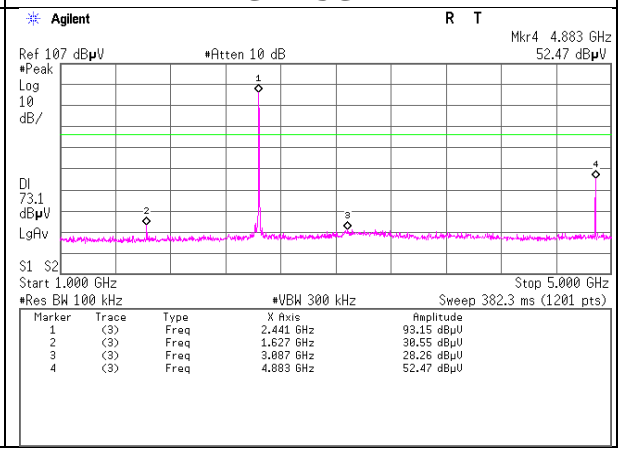
150kHz-30MHz



30MHz-1GHz



1GHz-5GHz

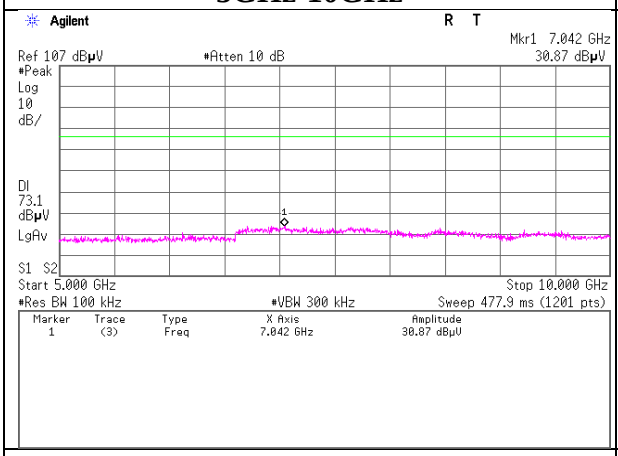


Conducted Spurious Emission

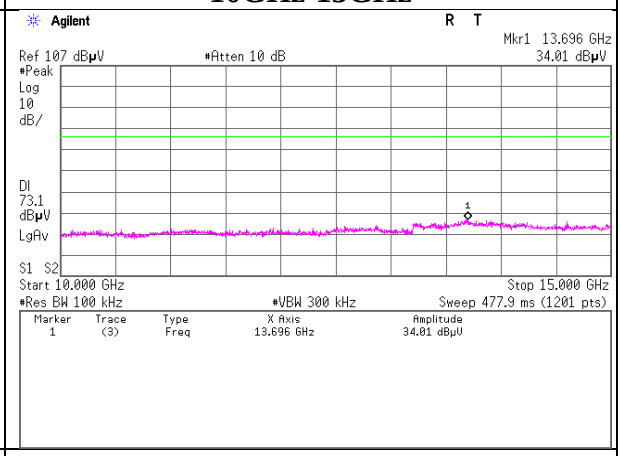
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10762685H
Date	04/21/2015
Temperature/ Humidity	25deg. C / 38% RH
Engineer	Kazuya Yoshioka
Mode	Tx (Hopping off) 3DH5

Tx 3DH5 2441MHz

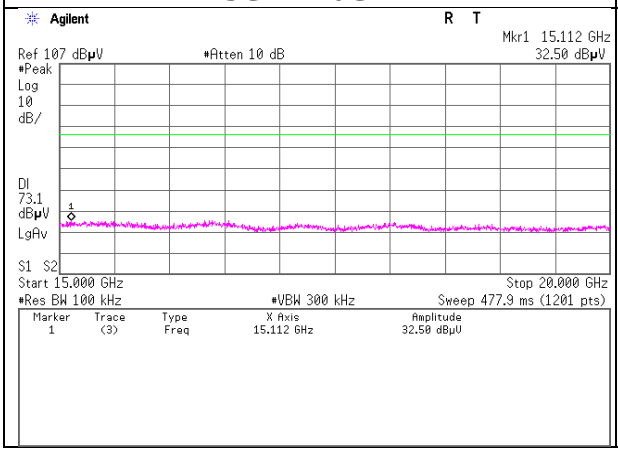
5GHz-10GHz



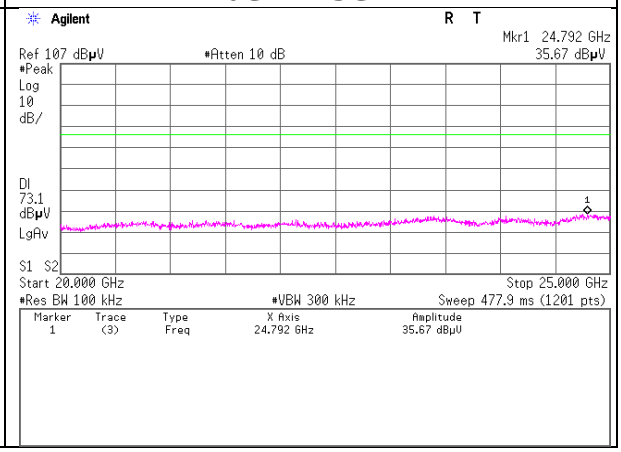
10GHz-15GHz



15GHz-20GHz



20GHz-25GHz

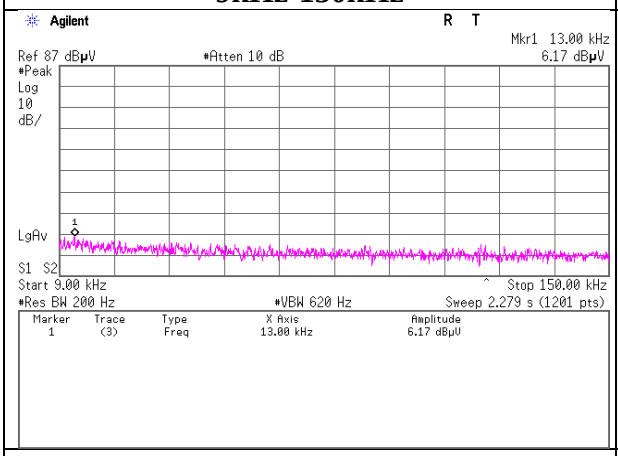


Conducted Spurious Emission

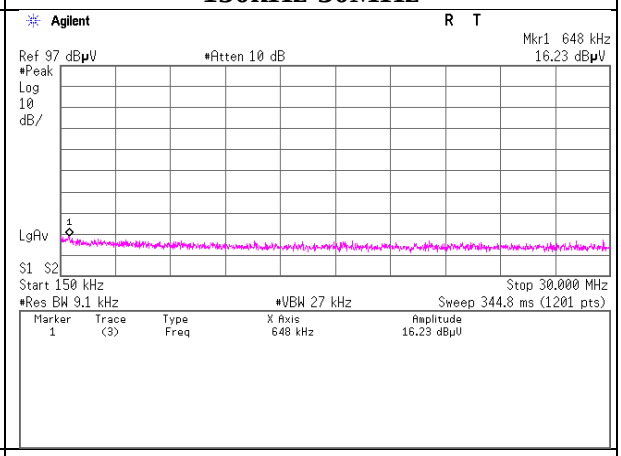
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10762685H
Date	04/21/2015
Temperature/ Humidity	25deg. C / 38% RH
Engineer	Kazuya Yoshioka
Mode	Tx (Hopping off) 3DH5

Tx 3DH5 2480MHz

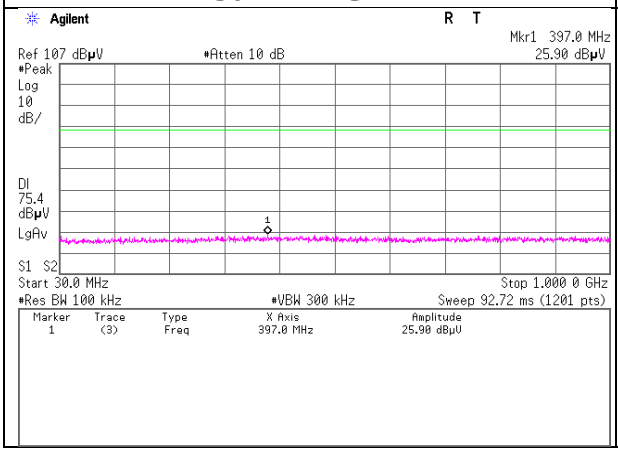
9kHz-150kHz



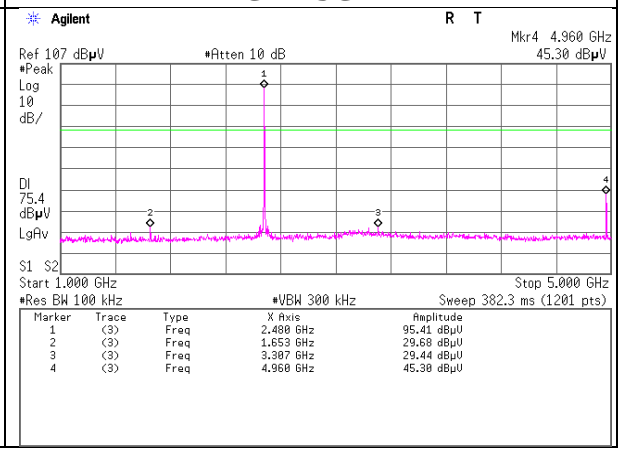
150kHz-30MHz



30MHz-1GHz



1GHz-5GHz

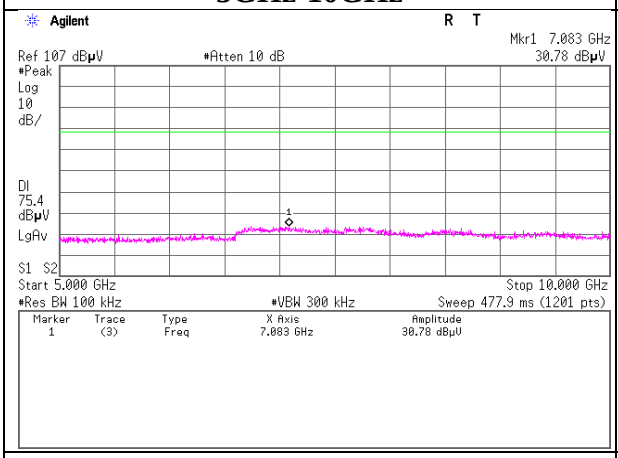


Conducted Spurious Emission

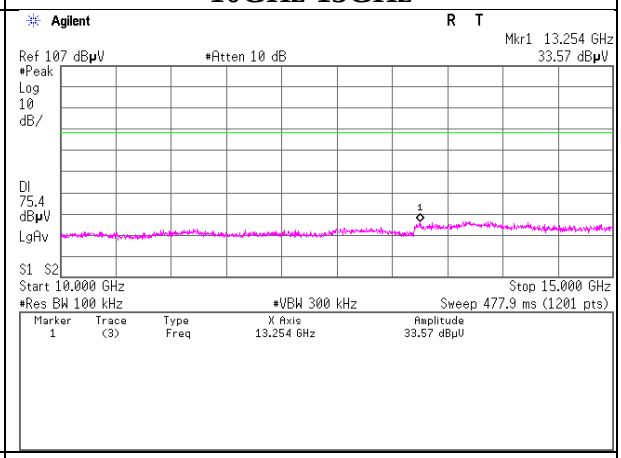
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10762685H
Date	04/21/2015
Temperature/ Humidity	25deg. C / 38% RH
Engineer	Kazuya Yoshioka
Mode	Tx (Hopping off) 3DH5

Tx 3DH5 2480MHz

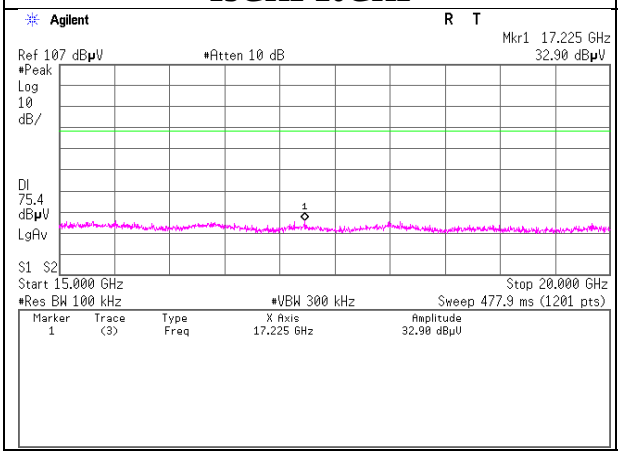
5GHz-10GHz



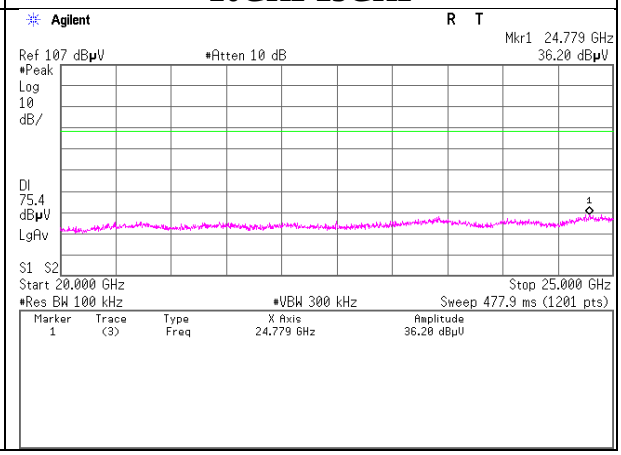
10GHz-15GHz



15GHz-20GHz



20GHz-25GHz

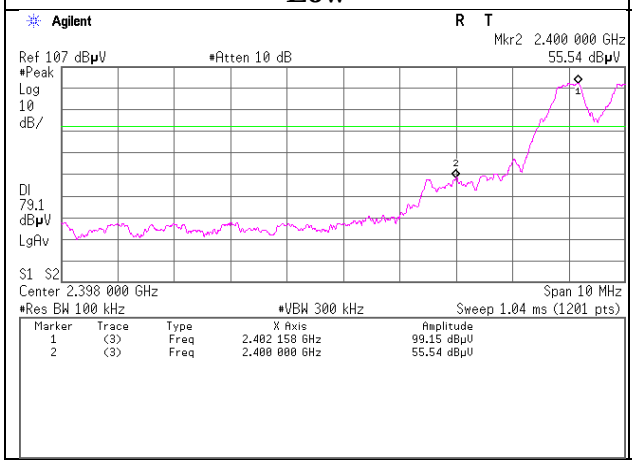


Conducted Emission Band Edge compliance

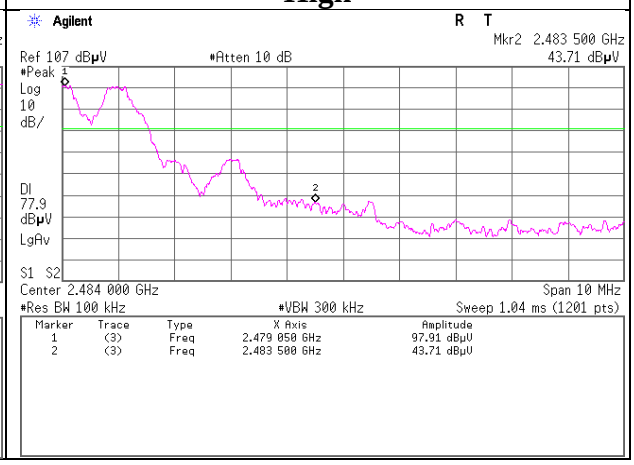
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10762685H
Date	04/21/2015
Temperature/ Humidity	25deg. C / 38% RH
Engineer	Kazuya Yoshioka
Mode	Tx (Hopping on/off) DH5

Tx DH5, Hopping on

Low

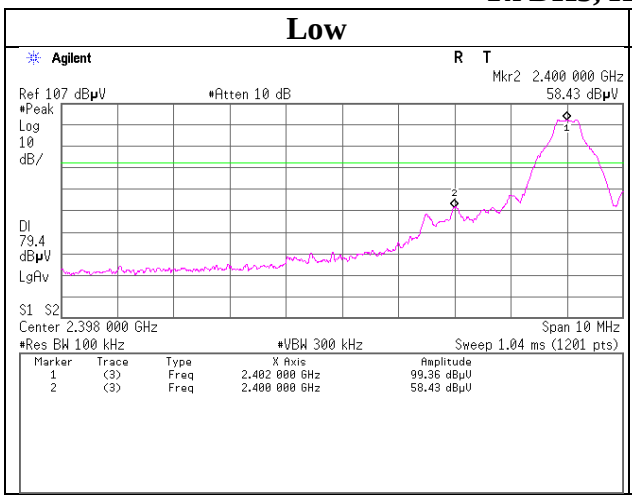


High



Tx DH5, Hopping off

Low



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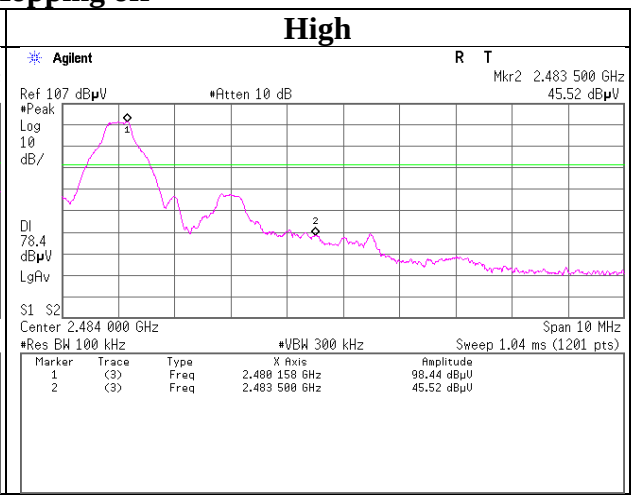
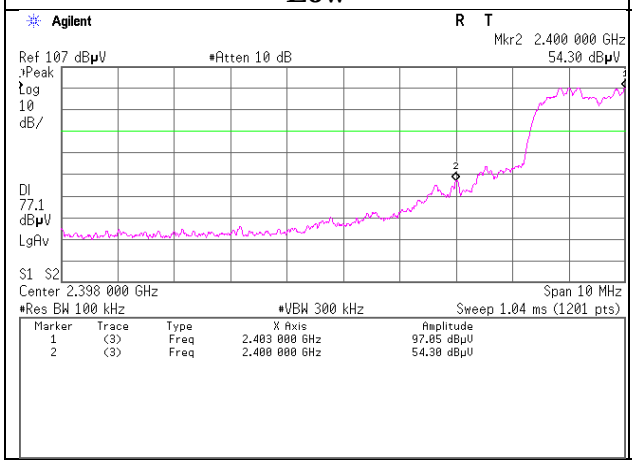


Conducted Emission Band Edge compliance

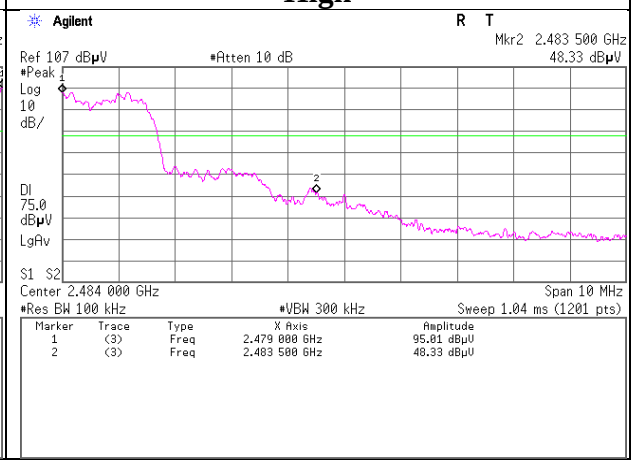
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10762685H
Date	04/21/2015
Temperature/ Humidity	25deg. C / 38% RH
Engineer	Kazuya Yoshioka
Mode	Tx (Hopping on/off) 3DH5

Tx 3DH5, Hopping on

Low

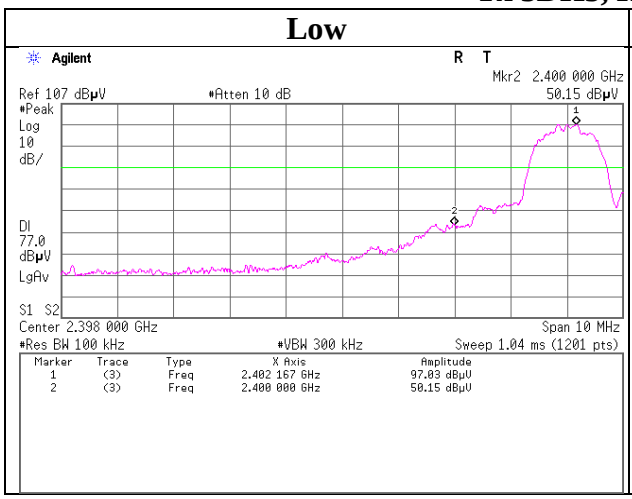


High

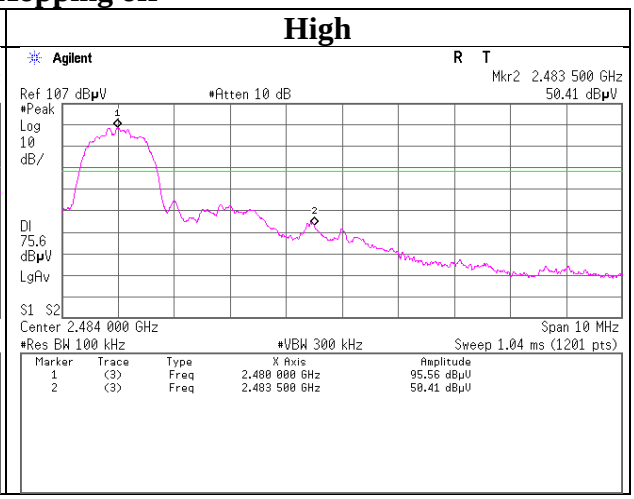


Tx 3DH5, Hopping off

Low



High

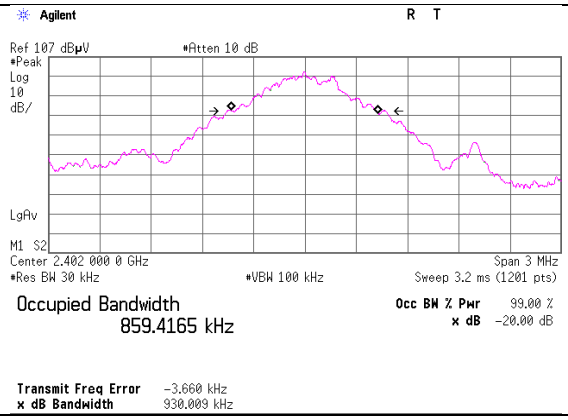


99%Occupied Bandwidth

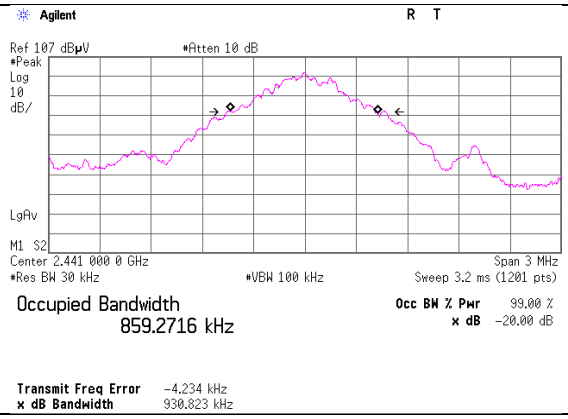
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10762685H
Date	04/21/2015
Temperature/ Humidity	25deg. C / 38% RH
Engineer	Kazuya Yoshioka
Mode	Tx (Hopping off) DH5/3DH5

Tx DH5, Hopping off

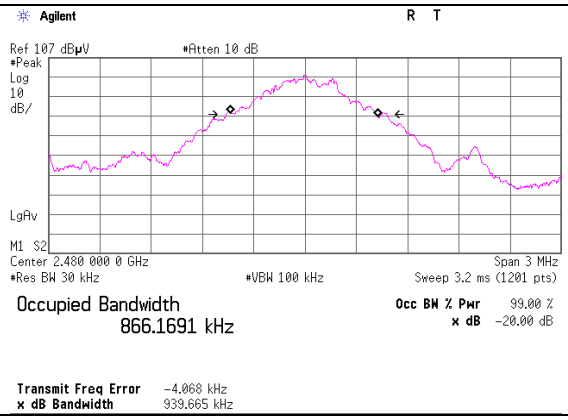
2402MHz



2441MHz

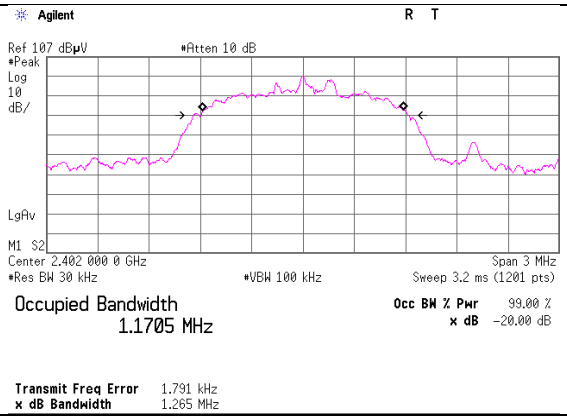


2480MHz

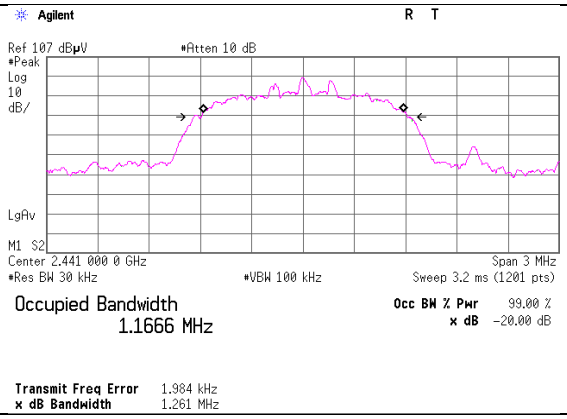


Tx 3DH5, Hopping off

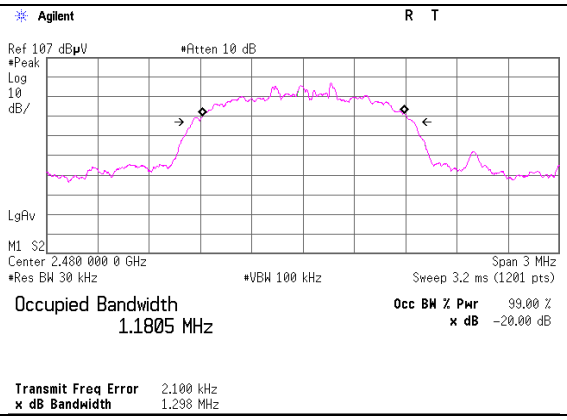
2402MHz



2441MHz



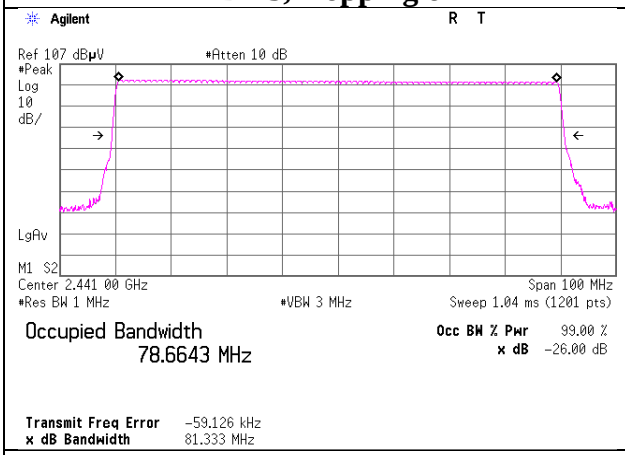
2480MHz



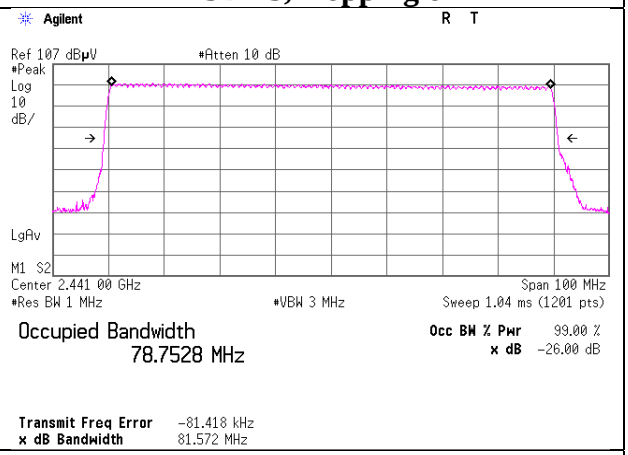
99% Occupied Bandwidth

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10762685H
Date	04/21/2015
Temperature/ Humidity	25deg. C / 38% RH
Engineer	Kazuya Yoshioka
Mode	Tx (Hopping on) DH5/3DH5/Inquiry

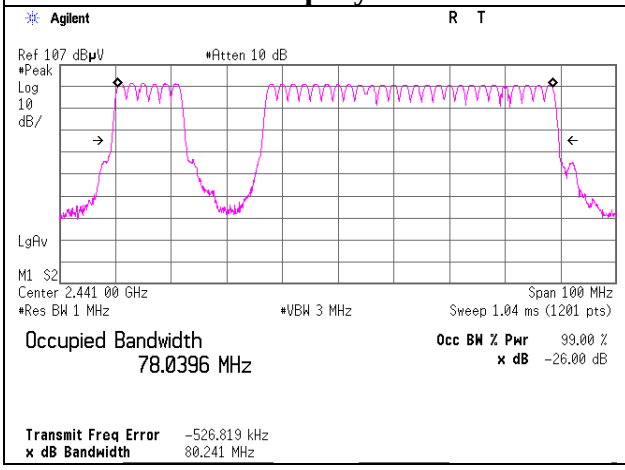
Tx DH5, Hopping on



Tx 3DH5, Hopping on



Inquiry



APPENDIX 2: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MOS-19	Thermo-Hygrometer	Custom	CTH-201	0001	AT	2014/12/22 * 12
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	AT	2015/02/26 * 12
MPM-12	Power Meter	Anritsu	ML2495A	0825002	AT	2014/06/16 * 12
MPSE-17	Power sensor	Anritsu	MA2411B	0738285	AT	2014/06/16 * 12
MAT-20	Attenuator(10dB)(above 1GHz)	HIROSE ELECTRIC CO.,LTD.	AT-110	-	AT	2015/01/08 * 12
MCC-98	Microwave Cable 1G-40GHz	Suhner	SUCOFLEX102	30819/2	AT	2014/05/16 * 12
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2015/02/19 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	1301	RE	2015/01/13 * 12
MJM-16	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MRENT-116	Spectrum Analyzer	Agilent	E4440A	MY46187620	RE	2015/03/09 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2014/05/26 * 12
MCC-167	Microwave Cable	Junkosha	MWX221	1404S374(1m) / 1405S074(5m)	RE	2014/05/26 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2015/03/19 * 12
MHF-25	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	001	RE	2014/09/22 * 12
MHA-16	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170306	RE	2014/05/26 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE	2014/08/19 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	1915	RE	2014/10/18 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	174	RE	2014/10/18 * 12
MCC-51	Coaxial cable	UL Japan	-	-	RE	2014/07/14 * 12
MAT-70	Attenuator(6dB)	Agilent	8491A-006	MY52460153	RE	2015/04/08 * 12
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	260834	RE	2015/03/10 * 12

The expiration date of the calibration is the end of the expired month.
All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.

As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

Test Item: RE: Radiated Emission
AT: Antenna Terminal Conducted test