



RADIO TEST REPORT

Test Report No. : 10854045S

Applicant : PIONEER CORPORATION
Type of Equipment : Car Audio with Bluetooth
Model No. : DVZ-1258
FCC ID : AJDK088
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. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
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)

Date of test: June 18 to July 3 , 2015

Representative test engineer:

Yasumasa Owaki
Engineer
Consumer Technology Division

Approved by:

Toyokazu Imamura
Leader
Consumer Technology Division



JAB
Testing
RTL02610

- The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan.
 There is no testing item of "Non-accreditation".

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1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN
Telephone : +81 463 50 6400
Facsimile : +81 463 50 6401

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SECTION 1: Customer information

Company Name : PIONEER CORPORATION
Address : 25-1 Yamada, Kawagoe-shi, Saitama-ken 350-8555, JAPAN
Telephone Number : +81-49-228-6415
Facsimile Number : +81-49-228-6493
Contact Person : Tomoyuki Tanaka

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

2.1 Identification of E.U.T.

Type of Equipment : Car Audio with Bluetooth
Model No. : DVZ-1258
Serial No. : Refer to Section 4, Clause 4.2
Rating : DC 12 V
Receipt Date of Sample : June 18, 2015
Country of Mass-production : Japan
Condition of EUT : Production 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

Model: DVZ-1258 (referred to as the EUT in this report) is a Car Audio with Bluetooth.

General Specification

Clock frequency(ies) in the system : 32.768 kHz, 26 MHz

Radio Specification (Bluetooth)

Radio type : Transceiver
Frequency of operation : 2402 MHz - 2480 MHz
Modulation : FHSS
Power supply (radio part input) : DC 1.8 V and DC 3.3 V
Antenna type : Pattern inverted F type
Antenna gain with cable loss : -0.53 dBi

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C: 2015, final revised on June 12, 2015 and effective July 13, 2015
Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits
Section 15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

* The revision on June 12, 2015 does not affect the test specification applied to the EUT.

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 *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)		-	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		4.1 dB 777.210 MHz, Quasi-Peak, Horizontal Tx 2480 MHz, 3DH5	Complied

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 has no AC mains.
*2) Radiated test was selected over 30 MHz based on section 15.247(d) and KDB 558074 D01 12.2.7.

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

FCC 15.31 (e)

The EUT provides stable voltage (DC 1.8 V and 3.3 V) 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, this EUT complies with the requirement.

FCC 15.203

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.

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.

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1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

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3.4 Uncertainty

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor $k = 2$.
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Item	Frequency range	Uncertainty (+/-)		
		No. 1 SAC / SR	No. 2 SAC / SR	No. 3 SAC / SR
Conducted emission (AC Mains) LISN	150kHz - 30MHz	3.6 dB	3.4 dB	3.4 dB
Radiated emission (Measurement distance: 3m)	9kHz - 30MHz	3.7 dB	3.5 dB	3.5 dB
	30MHz - 300MHz	4.9 dB	4.9 dB	4.7 dB
	300MHz - 1GHz	5.0 dB	5.0 dB	4.8 dB
	1GHz - 15GHz	4.9 dB	4.9 dB	4.9 dB
Radiated emission (Measurement distance: 1m)	15GHz - 18GHz	5.7 dB	5.7 dB	5.7 dB
	18GHz - 40GHz	4.5 dB	4.3 dB	4.3 dB

SAC=Semi-Anechoic Chamber

SR= Shielded Room is applied besides radiated emission

Antenna terminal test	Uncertainty (+/-)
Power Measurement above 1GHz	0.68dB
Spurious emission (Conducted) below 1GHz	1.5dB
Spurious emission (Conducted) 1GHz - 3GHz	1.7dB
Spurious emission (Conducted) 3GHz - 18GHz	2.4dB
Spurious emission (Conducted) 18GHz - 26.5GHz	2.5dB
Bandwidth Measurement	0.66%

Radiated emission test

The data listed in this report meets the limits unless the uncertainty is taken into consideration.

3.5 Test Location

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JAB Accreditation No. RTL02610

Test site	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
No.1 Semi-anechoic chamber	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
No.2 Semi-anechoic chamber	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
No.3 Semi-anechoic chamber	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5m
No.4 Semi-anechoic chamber	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
No.1 Shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.2 Shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.3 Shielded room	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
No.4 Shielded room	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
No.5 Shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.6 Shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.8 shielded room	-	3.45 x 5.5 x 2.4	3.45 x 5.5	-
No.1 Measurement room	-	2.55 x 4.1 x 2.5	-	-

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

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Facsimile : +81 463 50 6401

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

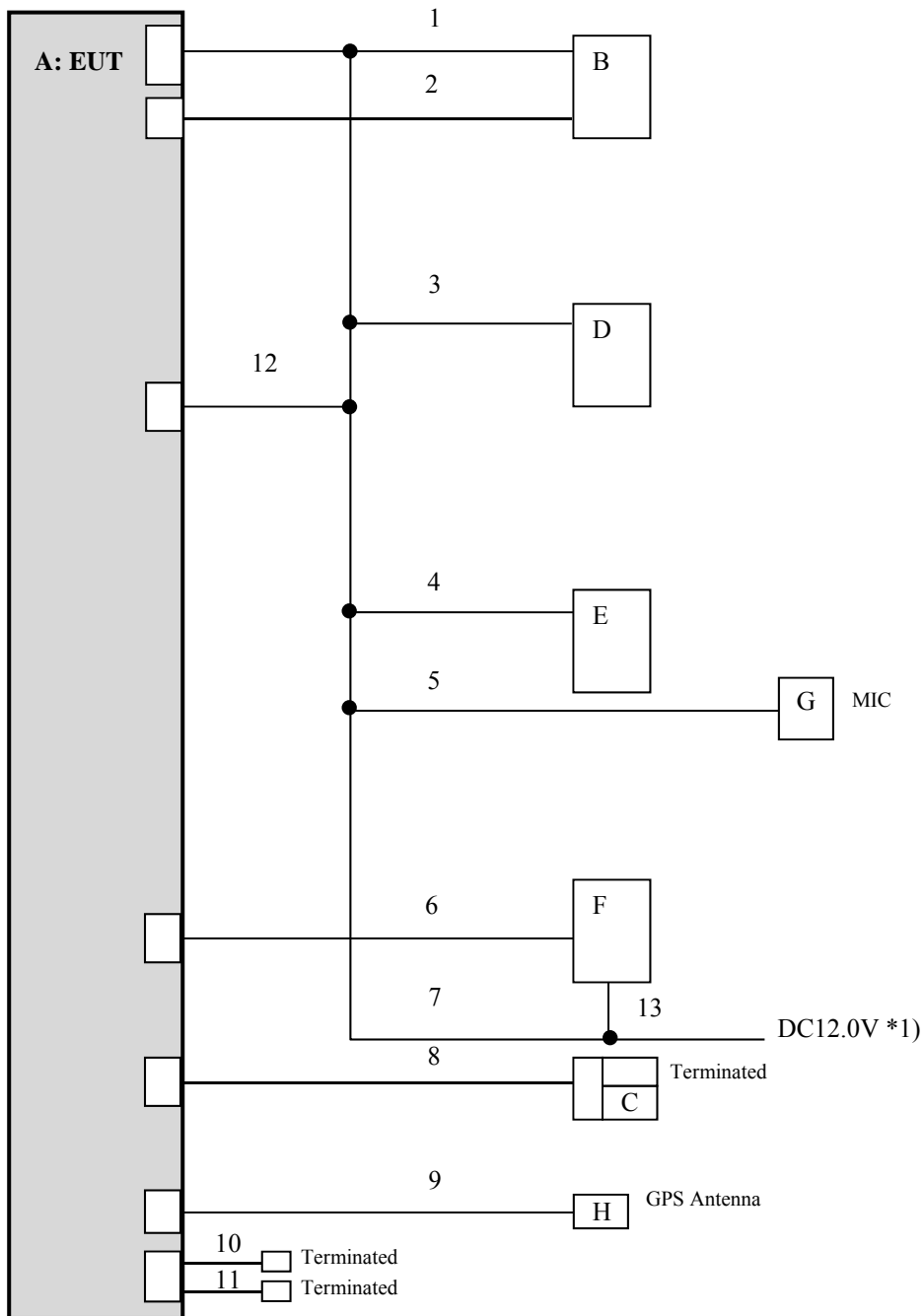
4.1 Operating Mode(s)

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

Details of Operating Mode(s)

Test Item	Mode	Tested frequency
Spurious Emission (Conducted/Radiated)	Tx (Hopping Off) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
Carrier Frequency Separation	Tx (Hopping On) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
20dB Bandwidth	Tx (Hopping Off) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
Number of Hopping Frequency	Tx (Hopping On) DH5, 3DH5	-
Dwell time	Tx (Hopping On), -DH1, DH3, DH5 -3DH1, 3DH3, 3DH5	-
Maximum Peak Output Power	Tx (Hopping Off) DH5, 2DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
Band Edge Compliance (Conducted)	Tx DH5, 3DH5 -Hopping On -Hopping Off	2402 MHz 2480 MHz
99% Occupied Bandwidth	Tx DH5, 3DH5 -Hopping On -Hopping Off	2402 MHz 2441 MHz 2480 MHz
<p>*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. * It is considered that the non-tested packet type (e.g. inquiry) can be omitted as it is complied with above all test items based on Bluetooth Core specification.</p> <p>EUT has the power settings by the software as follows; Power settings: Fixed Software: MLT 3rd Series log ver. 20110928</p>		

4.2 Configuration and peripherals



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

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Car Audio with Bluetooth	DVZ-1258	AABB000027CS *2) 0DPK000003CS *3)	Pioneer	EUT
B	Display	86110-60500	5666	Panasonic	-
C	USB Memory	USN4GL-W	-	Sony	-
D	Steering Switch	-	-	Panasonic	-
E	Rear Camera	GP-KD6301RC (86790-30150)	23C08020	-	-
F	Amplifier	GM-4038ZT/WL (86280-53190)	TPJA000138WL	Pioneer	-
G	Microphone	-	-	-	-
H	GPS Antenna	86860-22090	-	AISIN	-

*1) DC power supply (Model No.: PAN35-10A) was used for DC 12.0V input.

*2) Used for Antenna Terminal conducted test

*3) Used for Radiated Emission test

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Signal cable for Display	1.9	Unshielded	Unshielded	-
2	GVIF cable	1.9	Unshielded	Unshielded	-
3	Signal cable for Steering Switch	2.0	Unshielded	Unshielded	-
4	Signal cable for Rear Camera	2.0	Unshielded	Unshielded	-
5	Signal cable for Microphone	2.1	Unshielded	Unshielded	-
6	Bus cable	2.0	Unshielded	Unshielded	-
7	DC power cable	3.1	Unshielded	Unshielded	-
8	USB cable	3.0	Shielded	Shielded	-
9	Antenna cable for GPS	1.7	Shielded	Shielded	-
10	HCI cable	3.3	Shielded	Shielded	-
11	HCI cable	3.3	Shielded	Shielded	-
12	Bus cable	1.6	Unshielded	Unshielded	-
13	Wire harness for amplifier	1.6	Unshielded	Unshielded	-

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Shonan EMC Lab.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

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Facsimile : +81 463 50 6401

SECTION 5: Radiated Spurious Emission

Test Procedure

EUT was placed on a platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane. The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity.

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 m and 4 m 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	30 MHz to 300 MHz	300 MHz to 1 GHz	Above 1 GHz
Antenna Type	Biconical	Logperiodic	Horn

In any 100 kHz 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 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

20 dBc 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 1 GHz	Above 1 GHz		20 dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	RBW: 1 MHz VBW: 10 Hz *1)	RBW: 100 kHz VBW: 300 kHz
Test Distance	3 m	3 m (below 10 GHz), 1 m*2) (above 10 GHz), 0.5 m*3) (above 26.5 GHz)		3 m (below 10 GHz), 1 m*2) (above 10 GHz), 0.5 m*3) (above 26.5 GHz)

*1) Although DA 00-705 accepts VBW = 10 Hz for AV measurements, it was confirmed that superfluous smoothing was not performed.

*2) Distance Factor: $20 \times \log(3.0 \text{ m} / 1.0 \text{ m}) = 9.5 \text{ dB}$

*3) Distance Factor: $20 \times \log(3.0 \text{ m} / 0.5 \text{ m}) = 15.6 \text{ dB}$

The EUT was set at 28.5 degree as normal position according to the EUT's specification.

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

Measurement range : 30 M - 25 GHz
Test data : APPENDIX
Test result : Pass

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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	3 MHz	30 kHz	100 kHz	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 *1)	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak Average *3)	-	Power Meter (Sensor: 50MHz BW)
Carrier Frequency Separation	3 MHz	30 kHz	100 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Number of Hopping Frequency	30 MHz	300 kHz	1 MHz	Auto	Peak	Max Hold	Spectrum Analyzer
Dwell Time	Zero Span	100 kHz, 1 MHz	300 kHz, 3 MHz	As necessary capture the entire dwell time per hopping channel	Peak	Clear Write	Spectrum Analyzer
Conducted Spurious Emission *2)	9 kHz to 150 kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150 kHz to 30 MHz	9.1 kHz	27 kHz				
	30 MHz to 25 GHz	100 kHz	300 kHz				
Conducted Spurious Emission Band Edge compliance	10 MHz	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
*1) The measurement was performed with Max Hold since the duty cycle was not 100 %. 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. (9 kHz -150 kHz: RBW = 200 Hz, 150 kHz - 30 MHz: RBW = 10 kHz) *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

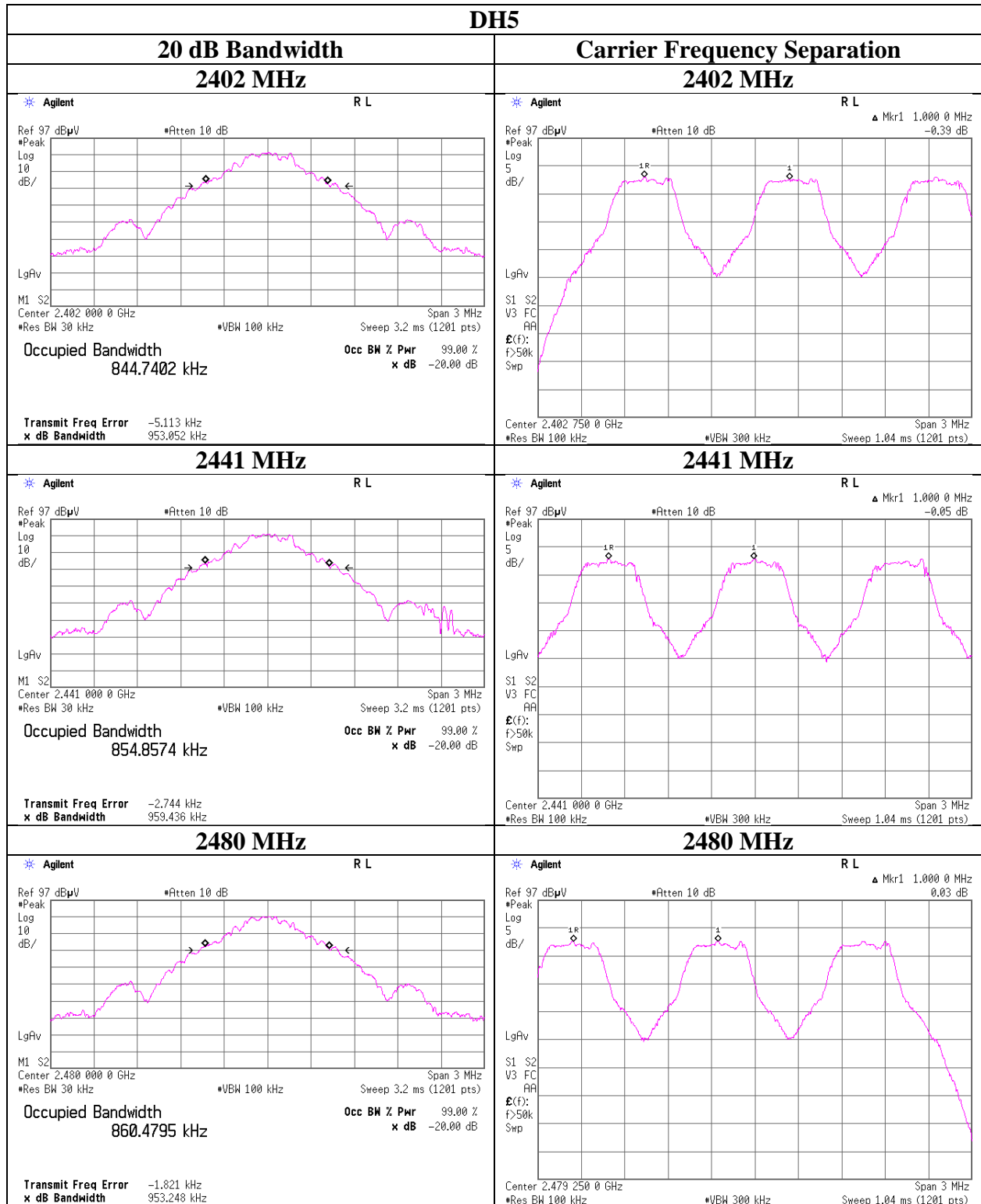
Test place Shonan EMC Lab. No.5 Shielded Room
Report No. 10854045S
Date June 23, 2015
Temperature / Humidity 23 deg. C / 49 % RH
Engineer Akio Hayashi
Mode Tx Hopping On

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.953	1.000	≥ 0.635
DH5	2441.0	0.959	1.000	≥ 0.639
DH5	2480.0	0.953	1.000	≥ 0.635
3DH5	2402.0	1.330	1.000	≥ 0.887
3DH5	2441.0	1.330	1.000	≥ 0.887
3DH5	2480.0	1.328	1.000	≥ 0.885

Limit: Two-thirds of 20dB Bandwidth or 25kHz (whichever is greater).

No limit applies to 20dB Bandwidth.

20dB Bandwidth and Carrier Frequency Separation



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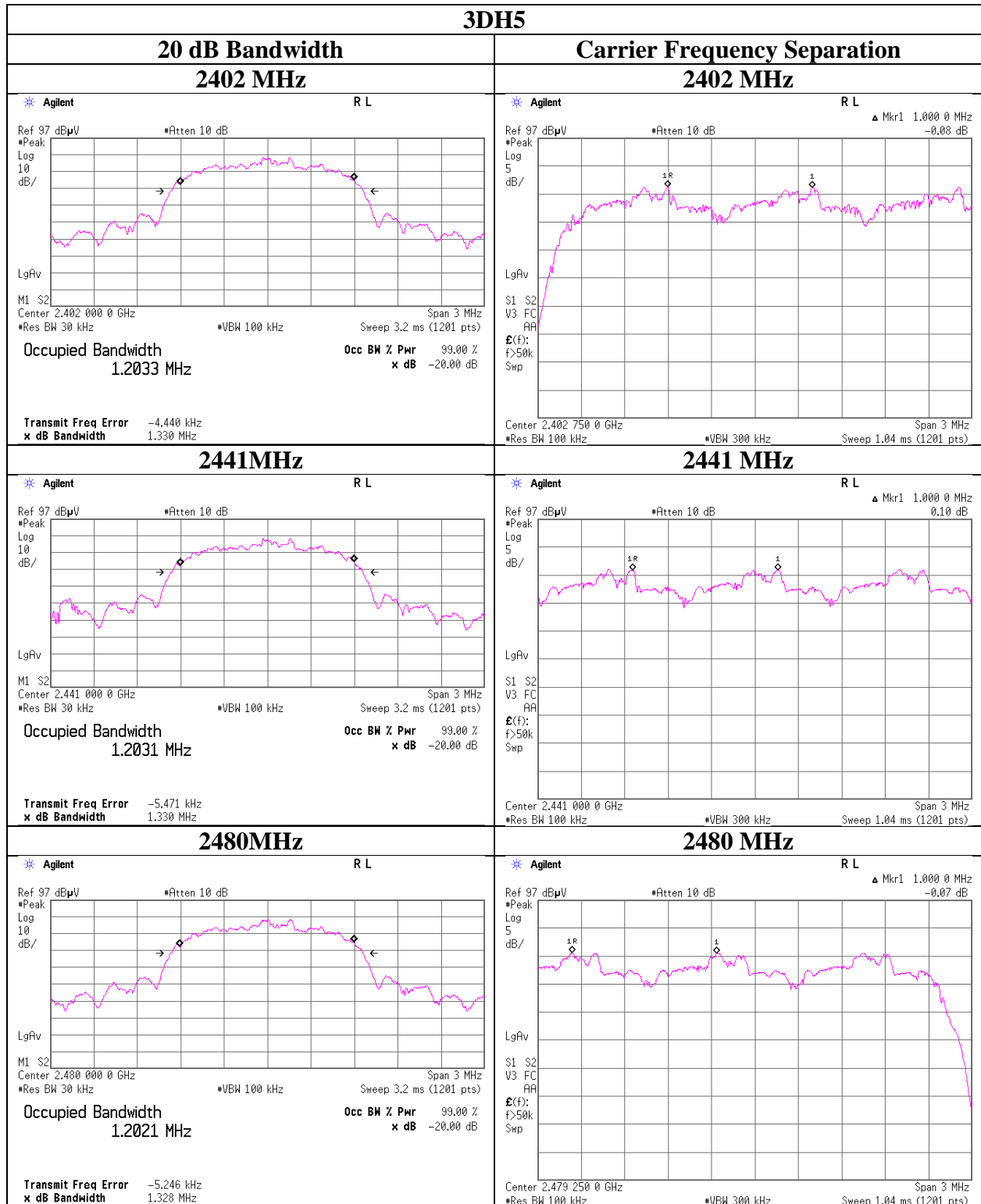
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1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

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20dB Bandwidth and Carrier Frequency Separation



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1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

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Facsimile : +81 463 50 6401

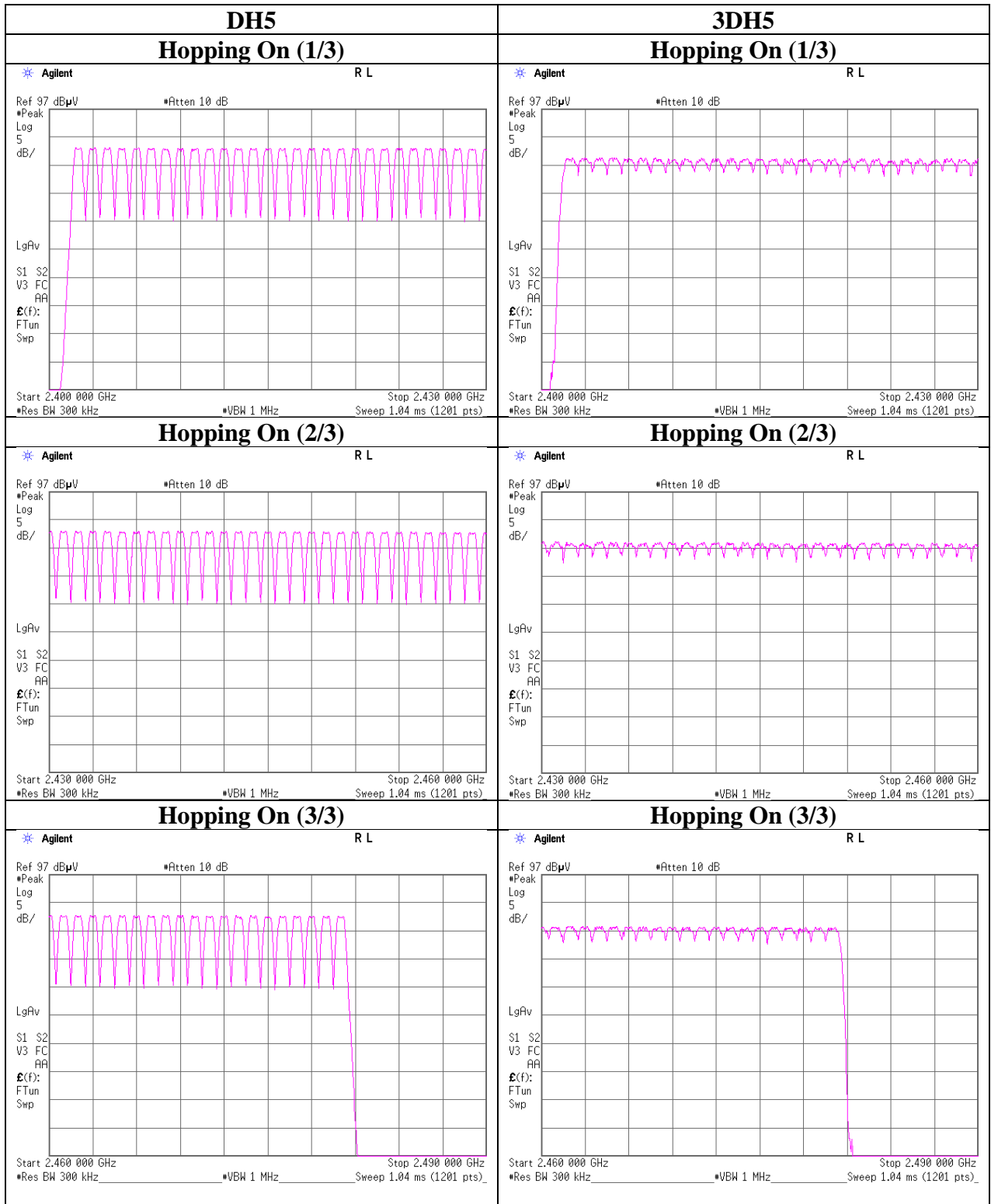
Number of Hopping Frequency

Test place Shonan EMC Lab. No.5 Shielded Room
Report No. 10854045S
Date June 23, 2015
Temperature / Humidity 23 deg. C / 48 % RH
Engineer Akio Hayashi
Mode Tx Hopping On

Mode	Number of channel [channels]	Limit [channels]
DH5	79	≥ 15
3DH5	79	≥ 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.

Number of Hopping Frequency



Dwell time

Test place : Shonan EMC Lab. No.5 Shielded Room
Report No. : 10854045S
Date : June 23, 2015
Temperature / Humidity : 23 deg. C / 48 % RH
Engineer : Akio Hayashi
Mode : Tx Hopping On

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 [msec]	Result [msec]	Limit [msec]
	times	sec.	times			
DH1	45.4 times	5 sec.	287 times	0.401	115	400
DH3	25.4 times	5 sec.	161 times	1.688	272	400
DH5	15.4 times	5 sec.	98 times	2.918	286	400
3DH1	44.8 times	5 sec.	284 times	0.427	121	400
3DH3	27.6 times	5 sec.	175 times	1.682	294	400
3DH5	20.2 times	5 sec.	128 times	2.934	376	400

Sample Calculation

Result = Number of transmission x Length of transmission

*Average data of 5 tests.(except Inquiry)

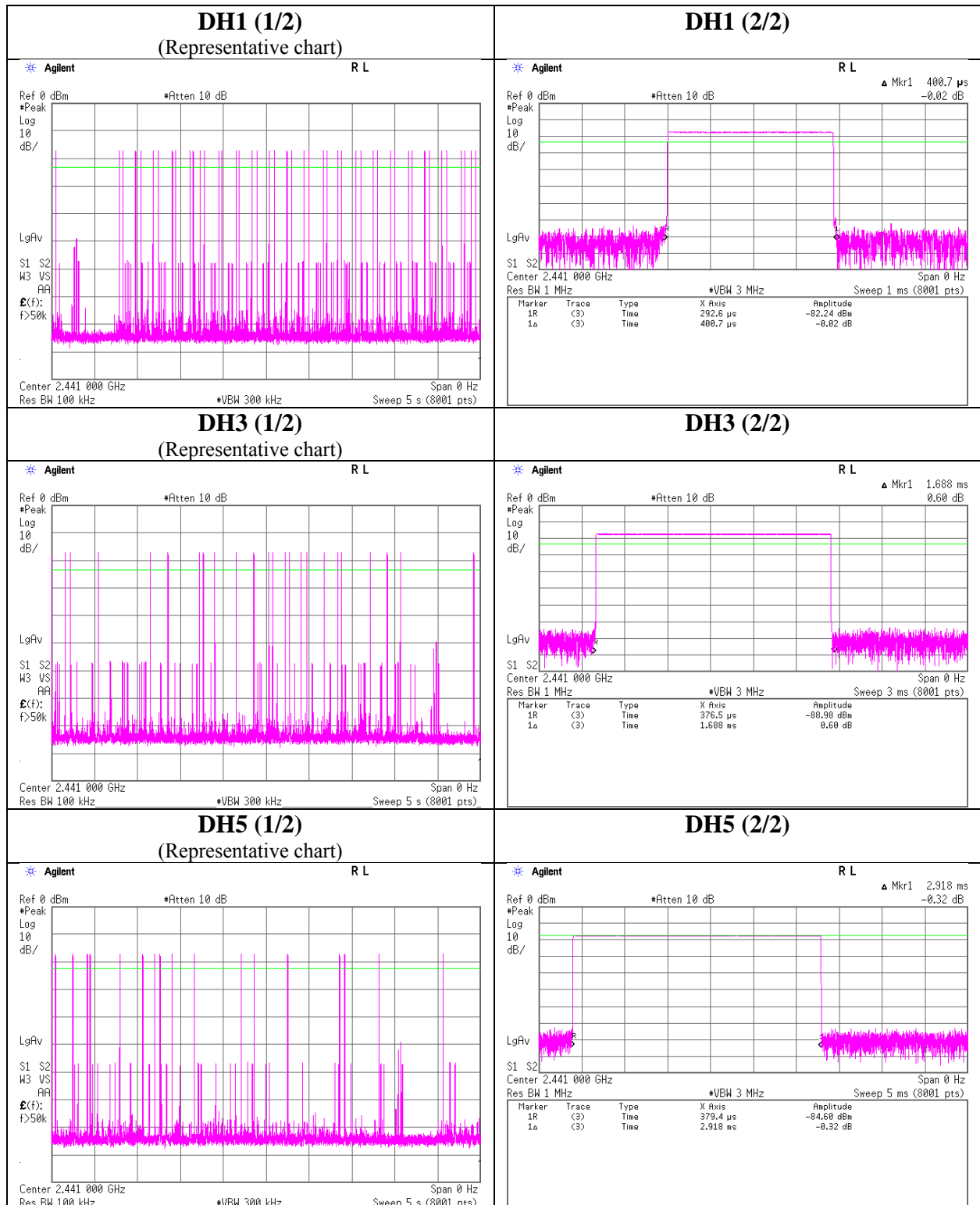
Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	45	45	46	45	46	45.4
DH3	24	25	29	25	24	25.4
DH5	18	13	13	19	14	15.4
3DH1	45	45	45	44	45	44.8
3DH3	30	28	26	27	27	27.6
3DH5	24	20	17	21	19	20.2

Sample Calculation

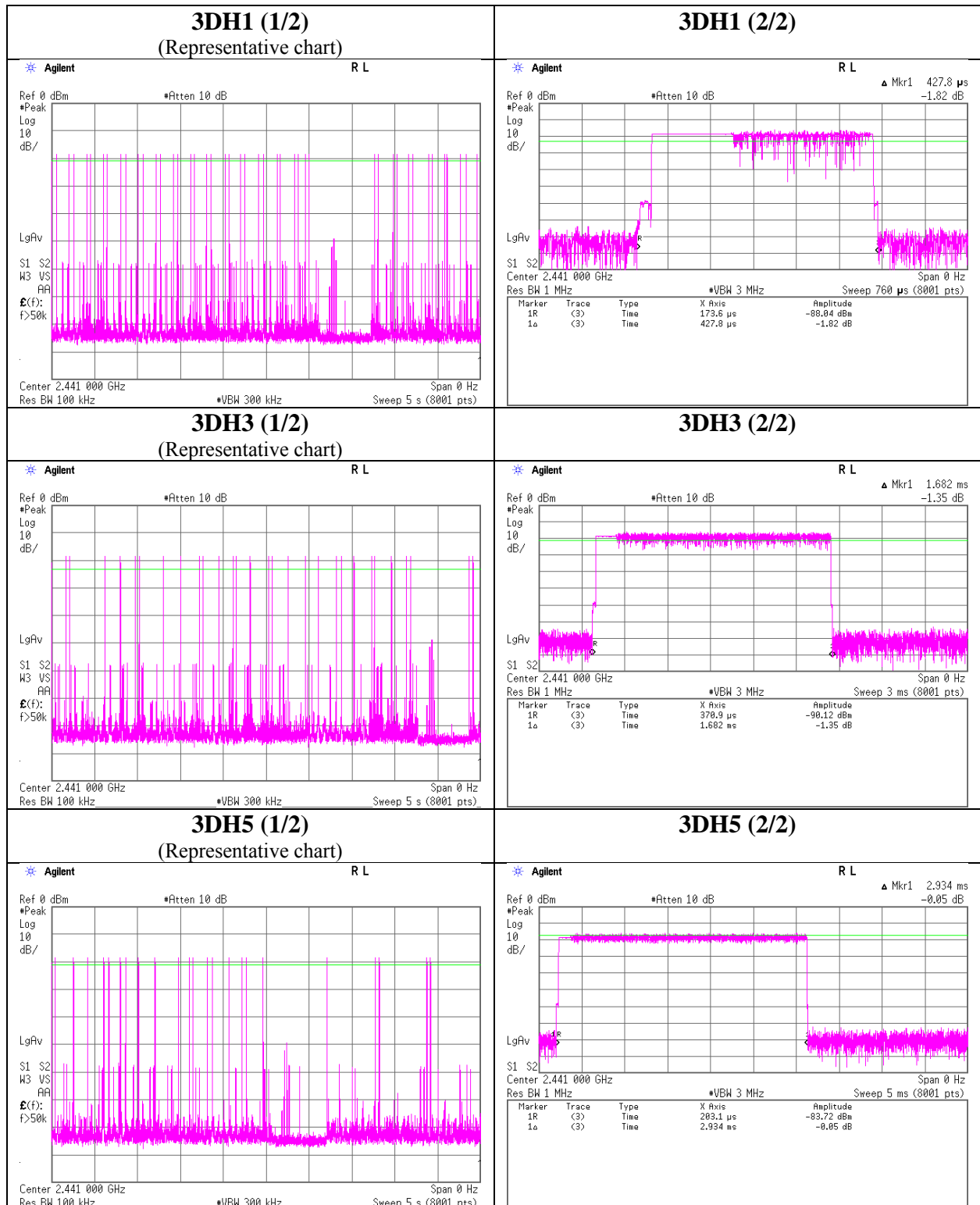
Average = Summation (Sampling 1 to 5) / 5

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 $N \times 0.4s$, where N is the number of channels being used in the hopping sequence ($20 \leq N \leq 79$), is always less than 0.4s regardless of packet size. This is confirmed in the test report for $N = 79$.

Dwell time



Dwell time



Maximum Peak Output Power

Test place : Shonan EMC Lab. No.5 Shielded Room /
Report No. : 10854045S
Date : June 23, 2015
Temperature / Humidity : 23 deg. C / 48 % RH
Engineer : Akio Hayashi
Mode : Tx Hopping Off

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
DH5	2402.0	-15.42	2.05	9.93	-3.44	0.45	20.96	125	24.40
DH5	2441.0	-15.55	2.06	9.93	-3.56	0.44	20.96	125	24.52
DH5	2480.0	-15.71	2.07	9.93	-3.71	0.43	20.96	125	24.67
2DH5	2402.0	-15.01	2.05	9.93	-3.03	0.50	20.96	125	23.99
2DH5	2441.0	-15.20	2.06	9.93	-3.21	0.48	20.96	125	24.17
2DH5	2480.0	-15.41	2.07	9.93	-3.41	0.46	20.96	125	24.37
3DH5	2402.0	-14.52	2.05	9.93	-2.54	0.56	20.96	125	23.50
3DH5	2441.0	-14.76	2.06	9.93	-2.77	0.53	20.96	125	23.73
3DH5	2480.0	-15.02	2.07	9.93	-3.02	0.50	20.96	125	23.98

Sample Calculation:

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

*The equipment and cables were not used for factor 0 dB of the data sheets.

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 RF Exposure)

Test place Shonan EMC Lab. No.5 Shielded Room
Report No. 10854045S
Date June 23, 2015
Temperature / Humidity 23 deg. C / 48 % RH
Engineer Akio Hayashi
Mode Tx Hopping Off

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Frame power)		Duty factor [dB]	Result (Burst power)	
					[dBm]	[mW]		[dBm]	[mW]
DH5	2402.0	-17.78	2.05	9.93	-5.80	0.26	1.10	-4.70	0.34
DH5	2441.0	-17.83	2.06	9.93	-5.84	0.26	1.10	-4.74	0.34
DH5	2480.0	-18.15	2.07	9.93	-6.15	0.24	1.10	-5.05	0.31
2DH5	2402.0	-19.30	2.05	9.93	-7.32	0.19	1.13	-6.19	0.24
2DH5	2441.0	-19.58	2.06	9.93	-7.59	0.17	1.13	-6.46	0.23
2DH5	2480.0	-19.90	2.07	9.93	-7.90	0.16	1.13	-6.77	0.21
3DH5	2402.0	-19.35	2.05	9.93	-7.37	0.18	1.13	-6.24	0.24
3DH5	2441.0	-19.58	2.06	9.93	-7.59	0.17	1.13	-6.46	0.23
3DH5	2480.0	-19.88	2.07	9.93	-7.88	0.16	1.13	-6.75	0.21

Sample Calculation:

Result (Frame power) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

Result (Burst power) = Frame power + Duty factor

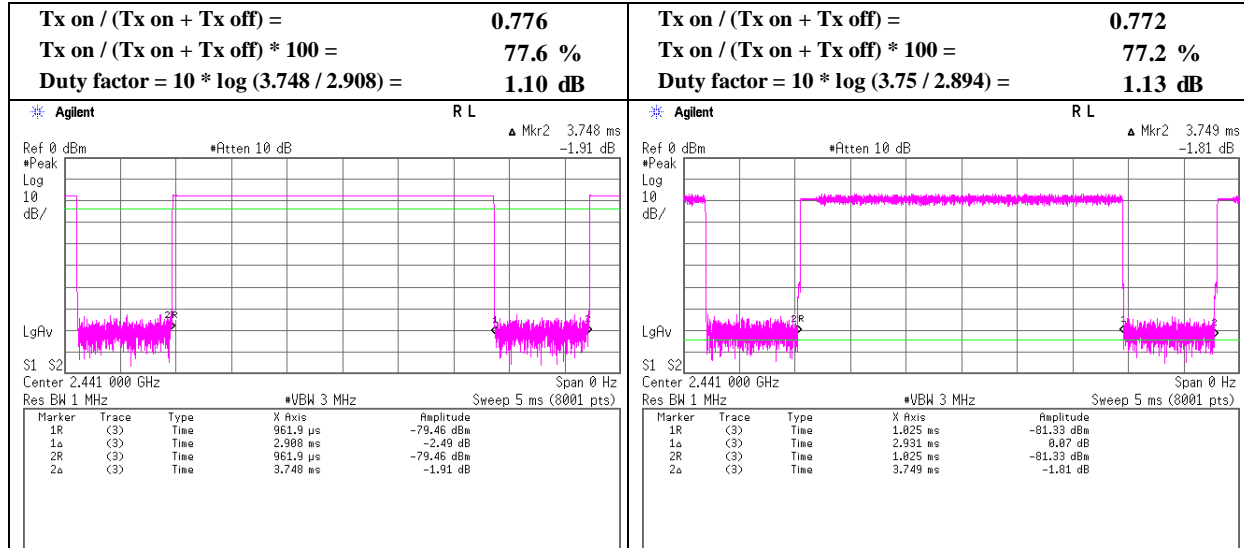
*The equipment and cables were not used for factor 0 dB of the data sheets.

Burst Rate Confirmation

Test place	Shonan EMC Lab. No 5 Shielded Room
Report No.	10854045S
Date	June 23, 2015
Temperature / Humidity	23 deg. C / 48 % RH
Engineer	Akio Hayashi
Mode	Tx Hopping Off

DH5

3DH5



Radiated Spurious Emission

Test place : Shonan EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 10854045S
Date : June 18, 2015 June 19, 2015 June 21, 2015
Temperature / Humidity : 25 deg. C / 59 % RH 25 deg. C / 60 % RH 24 deg. C / 59 % RH
Engineer : Yasumasa Owaki Yasumasa Owaki Yasumasa Owaki
Mode : Tx DH5 2402 MHz

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant. Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	444.121	QP	46.7	16.8	7.5	31.6	0.0	39.4	46.0	6.6	100	358	
Hori.	723.513	QP	41.3	20.4	8.9	31.4	0.0	39.2	46.0	6.8	100	3	
Hori.	737.316	QP	39.9	20.5	8.9	31.4	0.0	37.9	46.0	8.1	100	4	
Hori.	777.208	QP	42.9	20.6	9.1	31.3	0.0	41.3	46.0	4.7	100	330	
Hori.	851.229	QP	39.5	21.6	9.4	31.0	0.0	39.5	46.0	6.5	171	0	
Hori.	925.247	QP	35.5	22.5	9.8	30.6	0.0	37.2	46.0	8.8	158	350	
Hori.	960.262	QP	35.8	22.6	9.9	30.4	0.0	37.9	53.9	16.0	104	224	
Hori.	1929.353	PK	44.9	25.5	13.3	34.7	0.5	49.5	73.9	24.4	100	210	
Hori.	2390.000	PK	44.6	25.9	13.7	34.2	0.5	50.5	73.9	23.4	100	188	
Hori.	4804.000	PK	41.9	30.4	6.1	33.8	0.5	45.1	73.9	28.8	100	0	
Hori.	7206.000	PK	42.7	36.3	7.5	33.9	0.5	53.1	73.9	20.8	100	0	
Hori.	9608.000	PK	44.0	38.3	8.7	34.7	0.5	56.8	73.9	17.1	100	0	
Hori.	12010.000	PK	44.4	39.3	9.2	34.3	0.5	59.1	73.9	14.8	100	0	
Hori.	1929.353	AV	35.0	25.5	13.3	34.7	0.5	39.6	53.9	14.3	100	210	
Hori.	2390.000	AV	30.6	25.9	13.7	34.2	0.5	36.5	53.9	17.4	100	188	
Hori.	4804.000	AV	29.3	30.4	6.1	33.8	0.5	32.5	53.9	21.4	100	0	
Hori.	7206.000	AV	30.6	36.3	7.5	33.9	0.5	41.0	53.9	12.9	100	0	
Hori.	9608.000	AV	31.2	38.3	8.7	34.7	0.5	44.0	53.9	9.9	100	0	
Hori.	12010.000	AV	31.5	39.3	9.2	34.3	0.5	46.2	53.9	7.7	100	0	
Vert.	777.207	QP	42.1	20.6	9.1	31.3	0.0	40.5	46.0	5.5	100	250	
Vert.	851.225	QP	40.0	21.6	9.4	31.0	0.0	40.0	46.0	6.0	100	255	
Vert.	925.255	QP	35.6	22.5	9.8	30.6	0.0	37.3	46.0	8.7	100	84	
Vert.	1929.356	PK	46.9	25.5	13.3	34.7	0.5	51.5	73.9	22.4	100	177	
Vert.	2390.000	PK	44.3	25.9	13.7	34.2	0.5	50.2	73.9	23.7	100	44	
Vert.	4804.000	PK	42.1	30.4	6.1	33.8	0.5	45.3	73.9	28.6	100	0	
Vert.	7206.000	PK	42.1	36.3	7.5	33.9	0.5	52.5	73.9	21.4	100	0	
Vert.	9608.000	PK	42.7	38.3	8.7	34.7	0.5	55.5	73.9	18.4	100	0	
Vert.	12010.000	PK	43.2	39.3	9.2	34.3	0.5	57.9	73.9	16.0	100	0	
Vert.	1929.356	AV	39.6	25.5	13.3	34.7	0.5	44.2	53.9	9.7	100	177	
Vert.	2390.000	AV	30.4	25.9	13.7	34.2	0.5	36.3	53.9	17.6	100	44	
Vert.	4804.000	AV	29.3	30.4	6.1	33.8	0.5	32.5	53.9	21.4	100	0	
Vert.	7206.000	AV	30.6	36.3	7.5	33.9	0.5	41.0	53.9	12.9	100	0	
Vert.	9608.000	AV	31.1	38.3	8.7	34.7	0.5	43.9	53.9	10.0	100.0	0.0	
Vert.	12010.000	AV	31.4	39.3	9.2	34.3	0.5	46.1	53.9	7.8	100.0	0.0	

Result = Reading + Ant. Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor
Distance factor : 1 GHz - 15 GHz : 20log(3.15 m / 3.0 m) = 0.5 dB
15 GHz - 40 GHz : 20log(1.0 m / 3.0 m) = -9.5 dB

20 dBc Data Sheet (RBW 100 kHz, VBW 300 kHz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant. Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	74.1	25.9	13.7	34.2	0.5	80.0	-	-	Carrier
Hori.	2400.000	PK	34.2	25.9	13.7	34.2	0.5	40.1	60.0	19.9	
Vert.	2402.000	PK	77.9	25.9	13.7	34.2	0.5	83.8	-	-	Carrier
Vert.	2400.000	PK	34.5	25.9	13.7	34.2	0.5	40.4	63.8	23.4	

Result = Reading + Ant. Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor
Distance factor : 1 GHz - 15 GHz : 20log(3.15 m / 3.0 m) = 0.5 dB
15 GHz - 40 GHz : 20log(1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 10854045S
Date : June 18, 2015 June 19, 2015 June 21, 2015
Temperature / Humidity : 25 deg. C / 59 % RH 25 deg. C / 60 % RH 24 deg. C / 59 % RH
Engineer : Yasumasa Owaki Yasumasa Owaki Yasumasa Owaki
Mode : Tx DH5 2441 MHz

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant. Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	444.120	QP	46.2	16.8	7.5	31.6	0.0	38.9	46.0	7.1	100		2
Hori.	723.514	QP	41.5	20.4	8.9	31.4	0.0	39.4	46.0	6.6	100		3
Hori.	737.319	QP	39.5	20.5	8.9	31.4	0.0	37.5	46.0	8.5	100		2
Hori.	777.208	QP	42.9	20.6	9.1	31.3	0.0	41.3	46.0	4.7	100		331
Hori.	851.229	QP	40.5	21.6	9.4	31.0	0.0	40.5	46.0	5.5	141		287
Hori.	925.246	QP	35.9	22.5	9.8	30.6	0.0	37.6	46.0	8.4	153		354
Hori.	960.261	QP	38.0	22.6	9.9	30.4	0.0	40.1	53.9	13.8	124		193
Hori.	1776.461	PK	46.9	25.1	13.1	34.8	0.5	50.8	73.9	23.1	100		221
Hori.	4882.000	PK	41.0	30.7	6.2	33.8	0.5	44.6	73.9	29.3	100		0
Hori.	7323.000	PK	41.9	36.4	7.6	33.8	0.5	52.6	73.9	21.3	100		0
Hori.	9764.000	PK	42.2	38.3	8.8	34.7	0.5	55.1	73.9	18.8	100		0
Hori.	12205.000	PK	42.3	39.2	9.3	34.4	0.5	56.9	73.9	17.0	100		0
Hori.	1776.461	AV	34.4	25.1	13.1	34.8	0.5	38.3	53.9	15.6	100		221
Hori.	4882.000	AV	29.3	30.7	6.2	33.8	0.5	32.9	53.9	21.0	100		0
Hori.	7323.000	AV	30.1	36.4	7.6	33.8	0.5	40.8	53.9	13.1	100		0
Hori.	9764.000	AV	30.6	38.3	8.8	34.7	0.5	43.5	53.9	10.4	100		0
Hori.	12205.000	AV	30.3	39.2	9.3	34.4	0.5	44.9	53.9	9.0	100		0
Vert.	777.209	QP	42.4	20.6	9.1	31.3	0.0	40.8	46.0	5.2	100		249
Vert.	851.228	QP	40.8	21.6	9.4	31.0	0.0	40.8	46.0	5.2	100		257
Vert.	925.250	QP	35.8	22.5	9.8	30.6	0.0	37.5	46.0	8.5	100		86
Vert.	1929.356	PK	46.9	25.5	13.3	34.7	0.5	51.5	73.9	22.4	100		177
Vert.	4882.000	PK	41.3	30.7	6.2	33.8	0.5	44.9	73.9	29.0	100		0
Vert.	7323.000	PK	41.9	36.4	7.6	33.8	0.5	52.6	73.9	21.3	100		0
Vert.	9764.000	PK	42.2	38.3	8.8	34.7	0.5	55.1	73.9	18.8	100		0
Vert.	12205.000	PK	43.0	39.2	9.3	34.4	0.5	57.6	73.9	16.3	100		0
Vert.	1929.356	AV	39.3	25.5	13.3	34.7	0.5	43.9	53.9	10.0	100		177
Vert.	4882.000	AV	29.3	30.7	6.2	33.8	0.5	32.9	53.9	21.0	100		0
Vert.	7323.000	AV	30.2	36.4	7.6	33.8	0.5	40.9	53.9	13.0	100		0
Vert.	9764.000	AV	30.6	38.3	8.8	34.7	0.5	43.5	53.9	10.4	100		0
Vert.	12205.000	AV	30.4	39.2	9.3	34.4	0.5	45.0	53.9	8.9	100		0

Result = Reading + Ant. Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor
Distance factor : 1 GHz - 15 GHz : $20\log(3.15\text{ m} / 3.0\text{ m}) = 0.5\text{ dB}$
15 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 10854045S
Date : June 18, 2015 June 19, 2015 June 21, 2015
Temperature / Humidity : 25 deg. C / 59 % RH 25 deg. C / 60 % RH 24 deg. C / 59 % RH
Engineer : Yasumasa Owaki Yasumasa Owaki Yasumasa Owaki
Mode : Tx DH5 2480 MHz

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant. Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	444.121	QP	45.9	16.8	7.5	31.6	0.0	38.6	46.0	7.4	100	359	
Hori.	723.515	QP	41.1	20.4	8.9	31.4	0.0	39.0	46.0	7.0	100	4	
Hori.	737.319	QP	38.4	20.5	8.9	31.4	0.0	36.4	46.0	9.6	100	335	
Hori.	777.207	QP	43.0	20.6	9.1	31.3	0.0	41.4	46.0	4.6	100	325	
Hori.	851.228	QP	40.4	21.6	9.4	31.0	0.0	40.4	46.0	5.6	141	290	
Hori.	925.247	QP	37.3	22.5	9.8	30.6	0.0	39.0	46.0	7.0	124	289	
Hori.	960.263	QP	35.8	22.6	9.9	30.4	0.0	37.9	53.9	16.0	102	223	
Hori.	1929.350	PK	45.8	25.5	13.3	34.7	0.5	50.4	73.9	23.5	100	207	
Hori.	2483.500	PK	46.1	25.9	13.8	34.1	0.5	52.2	73.9	21.7	120	169	
Hori.	4960.000	PK	40.5	31.0	6.4	33.9	0.5	44.5	73.9	29.4	100	0	
Hori.	7440.000	PK	41.5	36.5	7.7	33.7	0.5	52.5	73.9	21.4	100	0	
Hori.	9920.000	PK	42.1	38.4	8.9	34.7	0.5	55.2	73.9	18.7	100	0	
Hori.	12400.000	PK	41.9	39.1	9.4	34.4	0.5	56.5	73.9	17.4	100	0	
Hori.	1929.350	AV	35.4	25.5	13.3	34.7	0.5	40.0	53.9	13.9	100	207	
Hori.	2483.500	AV	32.0	25.9	13.8	34.1	0.5	38.1	53.9	15.8	120	169	
Hori.	4960.000	AV	29.2	31.0	6.4	33.9	0.5	33.2	53.9	20.7	100	0	
Hori.	7440.000	AV	29.8	36.5	7.7	33.7	0.5	40.8	53.9	13.1	100	0	
Hori.	9920.000	AV	29.8	38.4	8.9	34.7	0.5	42.9	53.9	11.0	100	0	
Hori.	12400.000	AV	29.4	39.1	9.4	34.4	0.5	44.0	53.9	9.9	100	0	
Vert.	777.208	QP	42.0	20.6	9.1	31.3	0.0	40.4	46.0	5.6	100	242	
Vert.	851.228	QP	40.5	21.6	9.4	31.0	0.0	40.5	46.0	5.5	100	256	
Vert.	925.247	QP	35.6	22.5	9.8	30.6	0.0	37.3	46.0	8.7	100	72	
Vert.	1929.353	PK	47.0	25.5	13.3	34.7	0.5	51.6	73.9	22.3	100	178	
Vert.	2483.500	PK	45.3	25.9	13.8	34.1	0.5	51.4	73.9	22.5	100	325	
Vert.	4960.000	PK	41.2	31.0	6.4	33.9	0.5	45.2	73.9	28.7	100	0	
Vert.	7440.000	PK	41.6	36.5	7.7	33.7	0.5	52.6	73.9	21.3	100	0	
Vert.	9920.000	PK	41.4	38.4	8.9	34.7	0.5	54.5	73.9	19.4	100	0	
Vert.	12400.000	PK	41.2	39.1	9.4	34.4	0.5	55.8	73.9	18.1	100	0	
Vert.	1929.353	AV	39.2	25.5	13.3	34.7	0.5	43.8	53.9	10.1	100	178	
Vert.	2483.500	AV	32.0	25.9	13.8	34.1	0.5	38.1	53.9	15.8	100	325	
Vert.	4960.000	AV	29.2	31.0	6.4	33.9	0.5	33.2	53.9	20.7	100	0	
Vert.	7440.000	AV	29.7	36.5	7.7	33.7	0.5	40.7	53.9	13.2	100	0	
Vert.	9920.000	AV	29.8	38.4	8.9	34.7	0.5	42.9	53.9	11.0	100	0	
Vert.	12400.000	AV	29.5	39.1	9.4	34.4	0.5	44.1	53.9	9.8	100	0	

Result = Reading + Ant. Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 15 GHz : 20log(3.15 m / 3.0 m) = 0.5 dB

15 GHz - 40 GHz : 20log(1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 10854045S
Date : June 18, 2015 June 19, 2015 June 21, 2015
Temperature / Humidity : 25 deg. C / 59 % RH 25 deg. C / 60 % RH 24 deg. C / 59 % RH
Engineer : Yasumasa Owaki Yasumasa Owaki Yasumasa Owaki
Mode : Tx 3DH5 2402 MHz

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant. Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	444.117	QP	46.5	16.8	7.5	31.6	0.0	39.2	46.0	6.8	100	2	
Hori.	737.319	QP	38.7	20.5	8.9	31.4	0.0	36.7	46.0	9.3	100	356	
Hori.	777.208	QP	43.3	20.6	9.1	31.3	0.0	41.7	46.0	4.3	160	278	
Hori.	851.228	QP	40.3	21.6	9.4	31.0	0.0	40.3	46.0	5.7	138	290	
Hori.	925.246	QP	36.0	22.5	9.8	30.6	0.0	37.7	46.0	8.3	158	338	
Hori.	960.260	QP	35.9	22.6	9.9	30.4	0.0	38.0	53.9	15.9	105	226	
Hori.	1929.362	PK	45.6	25.5	13.3	34.7	0.5	50.2	73.9	23.7	100	207	
Hori.	2390.000	PK	44.5	25.9	13.7	34.2	0.5	50.4	73.9	23.5	100	190	
Hori.	2886.746	PK	45.5	26.8	5.7	34.3	0.5	44.2	73.9	29.7	100	119	
Hori.	4804.000	PK	41.5	30.4	6.1	33.8	0.5	44.7	73.9	29.2	100	0	
Hori.	7206.000	PK	42.5	36.3	7.5	33.9	0.5	52.9	73.9	21.0	100	0	
Hori.	9608.000	PK	43.7	38.3	8.7	34.7	0.5	56.5	73.9	17.4	100	0	
Hori.	12010.000	PK	43.7	39.3	9.2	34.3	0.5	58.4	73.9	15.5	100	0	
Hori.	1929.362	AV	35.4	25.5	13.3	34.7	0.5	40.0	53.9	13.9	100	207	
Hori.	2390.000	AV	31.7	25.9	13.7	34.2	0.5	37.6	53.9	16.3	100	190	
Hori.	2886.746	AV	34.6	26.8	5.7	34.3	0.5	33.3	53.9	20.6	100	119	
Hori.	4804.000	AV	29.3	30.4	6.1	33.8	0.5	32.5	53.9	21.4	100	0	
Hori.	7206.000	AV	30.7	36.3	7.5	33.9	0.5	41.1	53.9	12.8	100	0	
Hori.	9608.000	AV	31.2	38.3	8.7	34.7	0.5	44.0	53.9	9.9	100	0	
Hori.	12010.000	AV	31.5	39.3	9.2	34.3	0.5	46.2	53.9	7.7	100	0	
Vert.	723.513	QP	41.3	20.4	8.9	31.4	0.0	39.2	46.0	6.8	100	227	
Vert.	777.209	QP	42.4	20.6	9.1	31.3	0.0	40.8	46.0	5.2	100	253	
Vert.	851.228	QP	40.6	21.6	9.4	31.0	0.0	40.6	46.0	5.4	100	260	
Vert.	925.252	QP	35.6	22.5	9.8	30.6	0.0	37.3	46.0	8.7	100	84	
Vert.	1929.355	PK	47.0	25.5	13.3	34.7	0.5	51.6	73.9	22.3	100	178	
Vert.	2390.000	PK	44.4	25.9	13.7	34.2	0.5	50.3	73.9	23.6	100	57	
Vert.	2886.766	PK	45.2	26.8	5.7	34.3	0.5	43.9	73.9	30.0	100	188	
Vert.	4804.000	PK	40.7	30.4	6.1	33.8	0.5	43.9	73.9	30.0	100	0	
Vert.	7206.000	PK	41.8	36.3	7.5	33.9	0.5	52.2	73.9	21.7	100	0	
Vert.	9608.000	PK	43.1	38.3	8.7	34.7	0.5	55.9	73.9	18.0	100	0	
Vert.	12010.000	PK	44.1	39.3	9.2	34.3	0.5	58.8	73.9	15.1	100	0	
Vert.	1929.355	AV	39.4	25.5	13.3	34.7	0.5	44.0	53.9	9.9	100	178	
Vert.	2390.000	AV	31.7	25.9	13.7	34.2	0.5	37.6	53.9	16.3	100	57	
Vert.	2886.766	AV	34.9	26.8	5.7	34.3	0.5	33.6	53.9	20.3	100	188	
Vert.	4804.000	AV	29.4	30.4	6.1	33.8	0.5	32.6	53.9	21.3	100	0	
Vert.	7206.000	AV	30.7	36.3	7.5	33.9	0.5	41.1	53.9	12.8	100	0	
Vert.	9608.000	AV	31.3	38.3	8.7	34.7	0.5	44.1	53.9	9.8	100	0	
Vert.	12010.000	AV	31.6	39.3	9.2	34.3	0.5	46.3	53.9	7.6	100	0	

Result = Reading + Ant. Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor
Distance factor : 1 GHz - 15 GHz : 20log(3.15 m / 3.0 m) = 0.5 dB
15 GHz - 40 GHz : 20log(1.0 m / 3.0 m) = -9.5 dB

20 dBc Data Sheet (RBW 100 kHz, VBW 300 kHz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant. Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	73.1	25.9	13.7	34.2	0.5	79.0	-	-	Carrier
Hori.	2400.000	PK	33.7	25.9	13.7	34.2	0.5	39.6	59.0	19.4	
Vert.	2402.000	PK	76.1	25.9	13.7	34.2	0.5	82.0	-	-	Carrier
Vert.	2400.000	PK	34.6	25.9	13.7	34.2	0.5	40.5	62.0	21.5	

Result = Reading + Ant. Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor
Distance factor : 1 GHz - 15 GHz : 20log(3.15 m / 3.0 m) = 0.5 dB
15 GHz - 40 GHz : 20log(1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 10854045S
Date : June 18, 2015 June 19, 2015 June 21, 2015
Temperature / Humidity : 25 deg. C / 59 % RH 25 deg. C / 60 % RH 24 deg. C / 59 % RH
Engineer : Yasumasa Owaki Yasumasa Owaki Yasumasa Owaki
Mode : Tx 3DH5 2441 MHz

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	444.118	QP	46.3	16.8	7.5	31.6	0.0	39.0	46.0	7.0	100	1	
Hori.	723.511	QP	41.6	20.4	8.9	31.4	0.0	39.5	46.0	6.5	100	2	
Hori.	737.318	QP	38.6	20.5	8.9	31.4	0.0	36.6	46.0	9.4	100	319	
Hori.	777.206	QP	43.1	20.6	9.1	31.3	0.0	41.5	46.0	4.5	100	332	
Hori.	851.229	QP	40.6	21.6	9.4	31.0	0.0	40.6	46.0	5.4	132	287	
Hori.	925.248	QP	35.9	22.5	9.8	30.6	0.0	37.6	46.0	8.4	155	351	
Hori.	960.259	QP	36.0	22.6	9.9	30.4	0.0	38.1	53.9	15.8	102	224	
Hori.	1929.355	PK	46.0	25.5	13.3	34.7	0.5	50.6	73.9	23.3	100	206	
Hori.	4882.000	PK	40.8	30.7	6.2	33.8	0.5	44.4	73.9	29.5	100	0	
Hori.	7323.000	PK	42.2	36.4	7.6	33.8	0.5	52.9	73.9	21.0	100	0	
Hori.	9764.000	PK	42.2	38.3	8.8	34.7	0.5	55.1	73.9	18.8	100	0	
Hori.	12205.000	PK	42.7	39.2	9.3	34.4	0.5	57.3	73.9	16.6	100	0	
Hori.	1929.355	AV	35.3	25.5	13.3	34.7	0.5	39.9	53.9	14.0	100	206	
Hori.	4882.000	AV	29.3	30.7	6.2	33.8	0.5	32.9	53.9	21.0	100	0	
Hori.	7323.000	AV	30.1	36.4	7.6	33.8	0.5	40.8	53.9	13.1	100	0	
Hori.	9764.000	AV	30.5	38.3	8.8	34.7	0.5	43.4	53.9	10.5	100	0	
Hori.	12205.000	AV	30.4	39.2	9.3	34.4	0.5	45.0	53.9	8.9	100	0	
Vert.	777.206	QP	42.4	20.6	9.1	31.3	0.0	40.8	46.0	5.2	100	249	
Vert.	851.228	QP	40.5	21.6	9.4	31.0	0.0	40.5	46.0	5.5	100	253	
Vert.	925.248	QP	35.7	22.5	9.8	30.6	0.0	37.4	46.0	8.6	100	79	
Vert.	1929.358	PK	46.8	25.5	13.3	34.7	0.5	51.4	73.9	22.5	100	178	
Vert.	4882.000	PK	42.2	30.7	6.2	33.8	0.5	45.8	73.9	28.1	100	0	
Vert.	7323.000	PK	42.2	36.4	7.6	33.8	0.5	52.9	73.9	21.0	100	0	
Vert.	9764.000	PK	42.0	38.3	8.8	34.7	0.5	54.9	73.9	19.0	100	0	
Vert.	12205.000	PK	43.2	39.2	9.3	34.4	0.5	57.8	73.9	16.1	100	0	
Vert.	1929.358	AV	39.0	25.5	13.3	34.7	0.5	43.6	53.9	10.3	100	178	
Vert.	4882.000	AV	29.3	30.7	6.2	33.8	0.5	32.9	53.9	21.0	100	0	
Vert.	7323.000	AV	30.1	36.4	7.6	33.8	0.5	40.8	53.9	13.1	100	0	
Vert.	9764.000	AV	30.5	38.3	8.8	34.7	0.5	43.4	53.9	10.5	100	0	
Vert.	12205.000	AV	30.4	39.2	9.3	34.4	0.5	45.0	53.9	8.9	100	0	

Result = Reading + Ant. Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor
Distance factor : 1 GHz - 15 GHz : $20\log(3.15\text{ m} / 3.0\text{ m}) = 0.5\text{ dB}$
15 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Radiated Spurious Emission

Test place : Shonan EMC Lab. No.2 Semi Anechoic Chamber
Report No. : 10854045S
Date : June 18, 2015 June 19, 2015 June 21, 2015
Temperature / Humidity : 25 deg. C / 59 % RH 25 deg. C / 60 % RH 24 deg. C / 59 % RH
Engineer : Yasumasa Owaki Yasumasa Owaki Yasumasa Owaki
Mode : Tx 3DH5 2480 MHz

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	444.120	QP	46.4	16.8	7.5	31.6	0.0	39.1	46.0	6.9	100		1
Hori.	723.514	QP	41.0	20.4	8.9	31.4	0.0	38.9	46.0	7.1	100		354
Hori.	737.318	QP	38.8	20.5	8.9	31.4	0.0	36.8	46.0	9.2	100		333
Hori.	777.210	QP	43.5	20.6	9.1	31.3	0.0	41.9	46.0	4.1	151		268
Hori.	851.229	QP	40.7	21.6	9.4	31.0	0.0	40.7	46.0	5.3	145		285
Hori.	925.247	QP	36.4	22.5	9.8	30.6	0.0	38.1	46.0	7.9	160		353
Hori.	960.265	QP	36.0	22.6	9.9	30.4	0.0	38.1	53.9	15.8	100		224
Hori.	1929.361	PK	46.0	25.5	13.3	34.7	0.5	50.6	73.9	23.3	100		206
Hori.	2483.500	PK	45.1	25.9	13.8	34.1	0.5	51.2	73.9	22.7	100		173
Hori.	4960.000	PK	40.7	31.0	6.4	33.9	0.5	44.7	73.9	29.2	100		0
Hori.	7440.000	PK	41.1	36.5	7.7	33.7	0.5	52.1	73.9	21.8	100		0
Hori.	9920.000	PK	42.0	38.4	8.9	34.7	0.5	55.1	73.9	18.8	100		0
Hori.	12400.000	PK	41.8	39.1	9.4	34.4	0.5	56.4	73.9	17.5	100		0
Hori.	1929.361	AV	35.2	25.5	13.3	34.7	0.5	39.8	53.9	14.1	100		206
Hori.	2483.500	AV	32.1	25.9	13.8	34.1	0.5	38.2	53.9	15.7	100		173
Hori.	4960.000	AV	29.3	31.0	6.4	33.9	0.5	33.3	53.9	20.6	100		0
Hori.	7440.000	AV	29.8	36.5	7.7	33.7	0.5	40.8	53.9	13.1	100		0
Hori.	9920.000	AV	29.9	38.4	8.9	34.7	0.5	43.0	53.9	10.9	100		0
Hori.	12400.000	AV	29.6	39.1	9.4	34.4	0.5	44.2	53.9	9.7	100		0
Vert.	777.207	QP	42.6	20.6	9.1	31.3	0.0	41.0	46.0	5.0	100		249
Vert.	851.228	QP	40.5	21.6	9.4	31.0	0.0	40.5	46.0	5.5	100		253
Vert.	925.251	QP	35.6	22.5	9.8	30.6	0.0	37.3	46.0	8.7	100		83
Vert.	1929.355	PK	47.3	25.5	13.3	34.7	0.5	51.9	73.9	22.0	100		175
Vert.	2483.500	PK	44.9	25.9	13.8	34.1	0.5	51.0	73.9	22.9	100		318
Vert.	4960.000	PK	40.9	31.0	6.4	33.9	0.5	44.9	73.9	29.0	100		0
Vert.	7440.000	PK	41.9	36.5	7.7	33.7	0.5	52.9	73.9	21.0	100		0
Vert.	9920.000	PK	41.3	38.4	8.9	34.7	0.5	54.4	73.9	19.5	100		0
Vert.	12400.000	PK	41.9	39.1	9.4	34.4	0.5	56.5	73.9	17.4	100		0
Vert.	1929.355	AV	39.2	25.5	13.3	34.7	0.5	43.8	53.9	10.1	100		175
Vert.	2483.500	AV	32.0	25.9	13.8	34.1	0.5	38.1	53.9	15.8	100		318
Vert.	4960.000	AV	29.3	31.0	6.4	33.9	0.5	33.3	53.9	20.6	100		0
Vert.	7440.000	AV	29.8	36.5	7.7	33.7	0.5	40.8	53.9	13.1	100		0
Vert.	9920.000	AV	29.9	38.4	8.9	34.7	0.5	43.0	53.9	10.9	100		0
Vert.	12400.000	AV	29.6	39.1	9.4	34.4	0.5	44.2	53.9	9.7	100		0

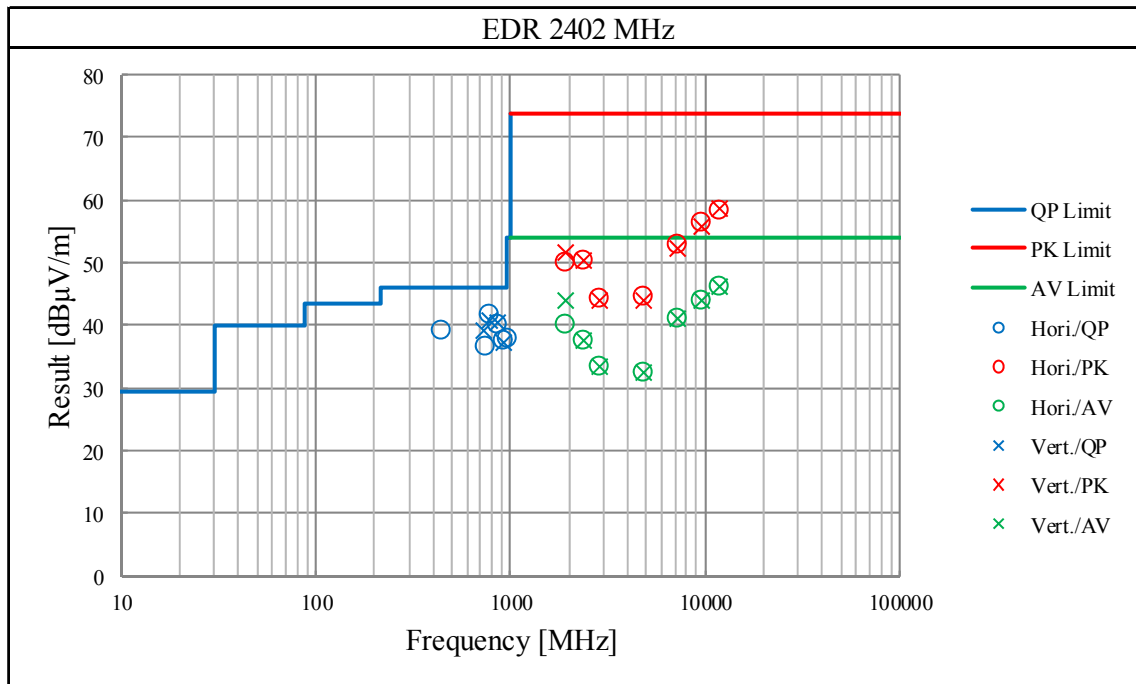
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 15 GHz : $20\log(3.15\text{ m} / 3.0\text{ m}) = 0.5\text{ dB}$

15 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Radiated Spurious Emission
(Plot data, Worst case)

Test place	Shonan EMC Lab. No.2 Semi Anechoic Chamber		
Report No.	10854045S		
Date	June 18, 2015	June 19, 2015	June 21, 2015
Temperature / Humidity	25 deg. C / 59 % RH	25 deg. C / 60 % RH	24 deg. C / 59 % RH
Engineer	Yasumasa Owaki	Yasumasa Owaki	Yasumasa Owaki
Mode	Tx 3DH5 2402 MHz		



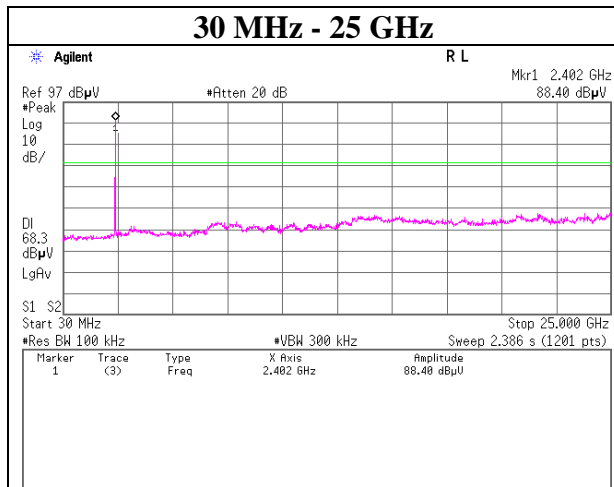
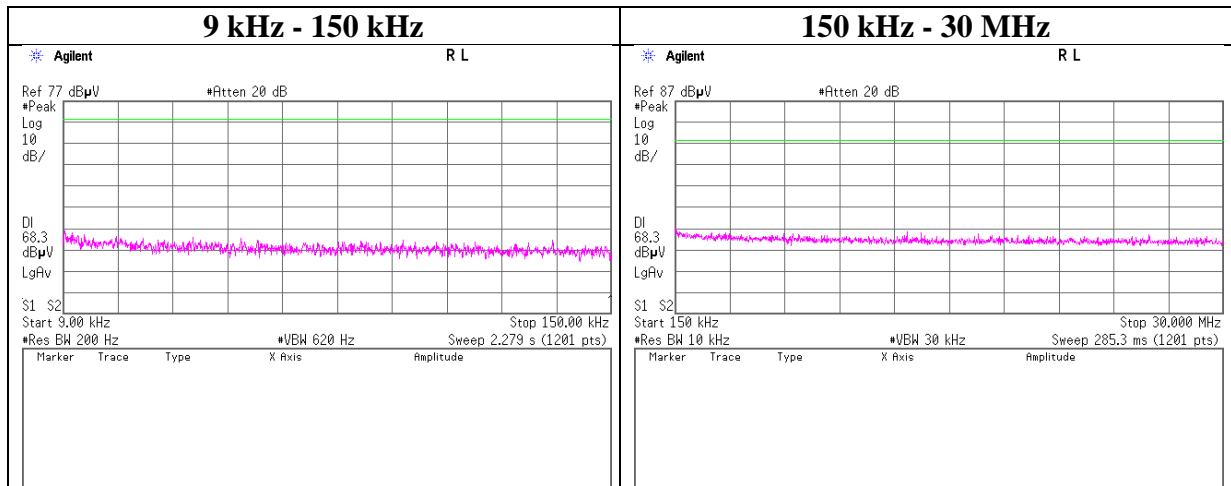
*These plots data contains sufficient number to show the trend of characteristic features for EUT.

ANSI C63.10:2013 Clause 6.3.4 states “For radiated emission test data reporting, both plots and tabular data shall be included”.

Conducted Spurious Emission

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10854045S
Date	July 3, 2015
Temperature / Humidity	23 deg. C / 48 % RH
Engineer	Akio Hayashi
Mode	Tx DH5

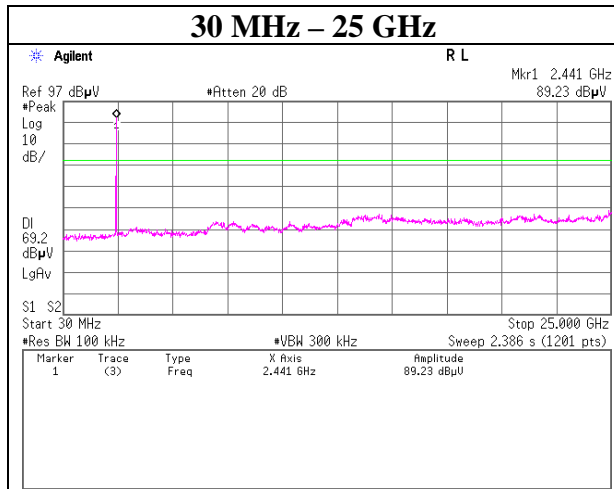
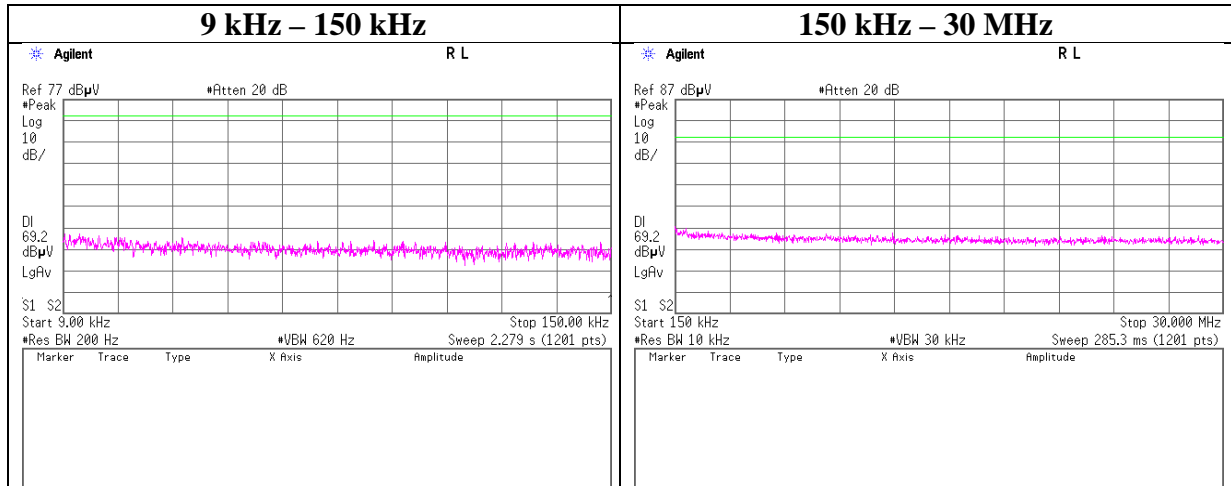
2402 MHz



Conducted Spurious Emission

Test place	Shonan EMC Lab. No 5 Shielded Room
Report No.	10854045S
Date	July 3, 2015
Temperature / Humidity	23 deg. C / 48 % RH
Engineer	Akio Hayashi
Mode	Tx DH5

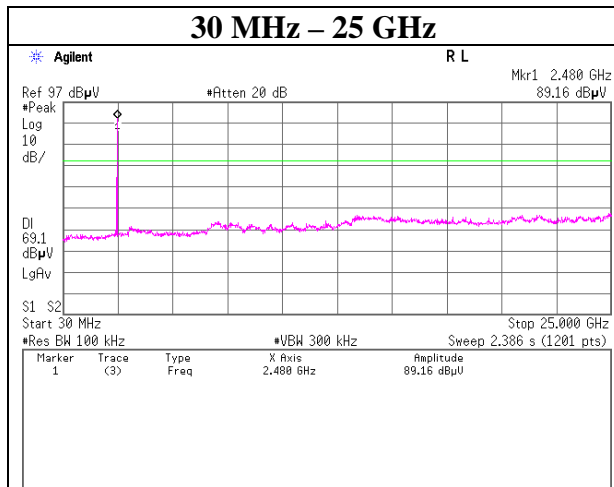
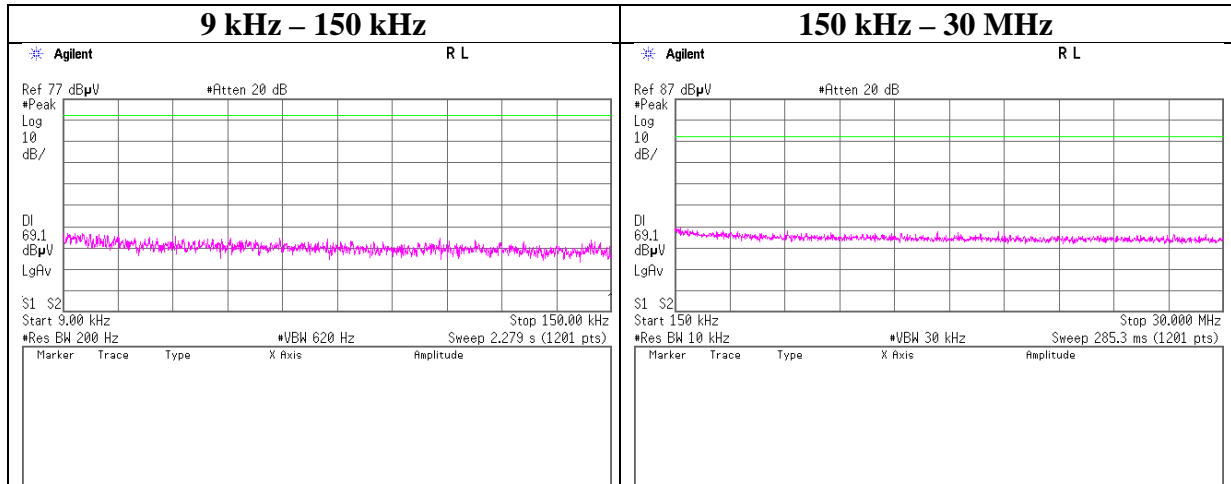
2441 MHz



Conducted Spurious Emission

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10854045S
Date	July 3, 2015
Temperature / Humidity	23 deg. C / 48 % RH
Engineer	Akio Hayashi
Mode	Tx DH5

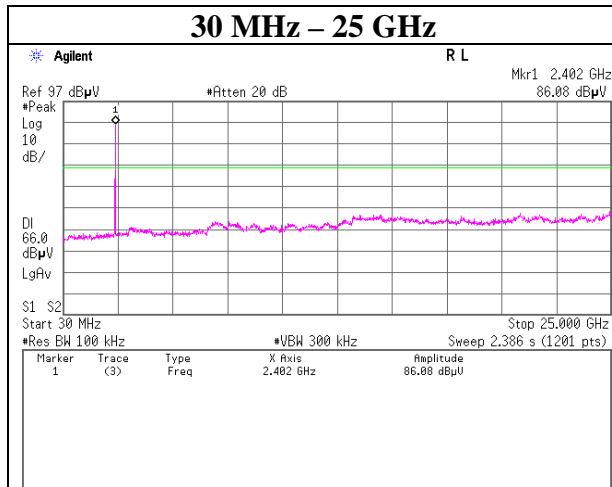
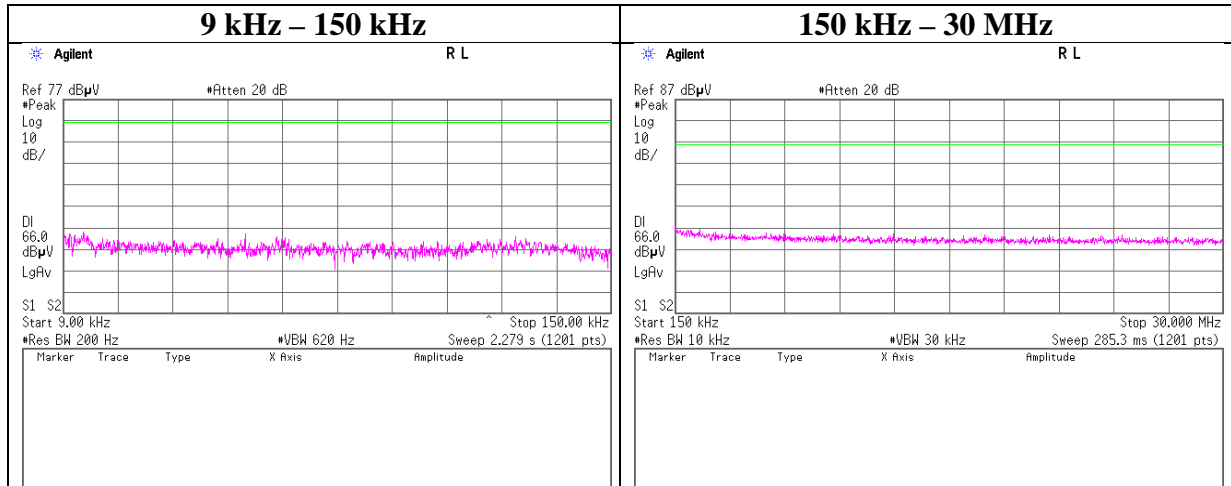
2480 MHz



Conducted Spurious Emission

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10854045S
Date	July 3, 2015
Temperature / Humidity	23 deg. C / 48 % RH
Engineer	Akio Hayashi
Mode	Tx 3DH5

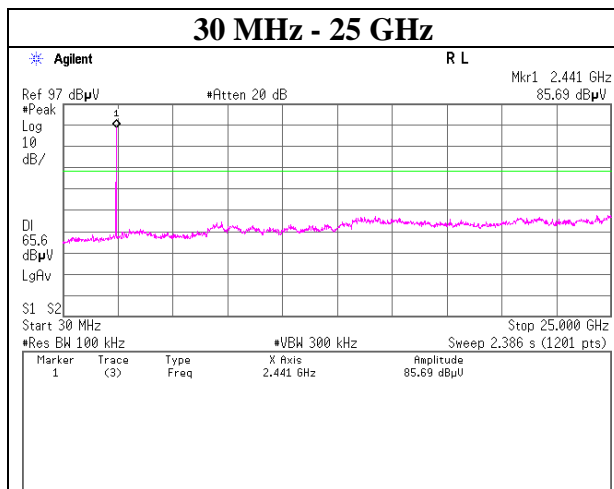
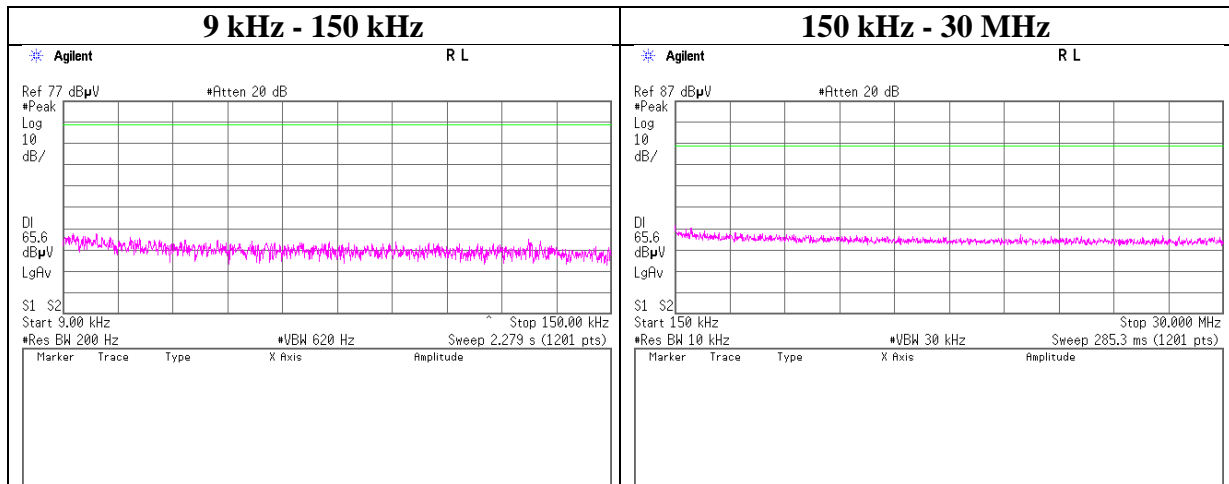
2402 MHz



Conducted Spurious Emission

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10854045S
Date	July 3, 2015
Temperature / Humidity	23 deg. C / 48 % RH
Engineer	Akio Hayashi
Mode	Tx 3DH5

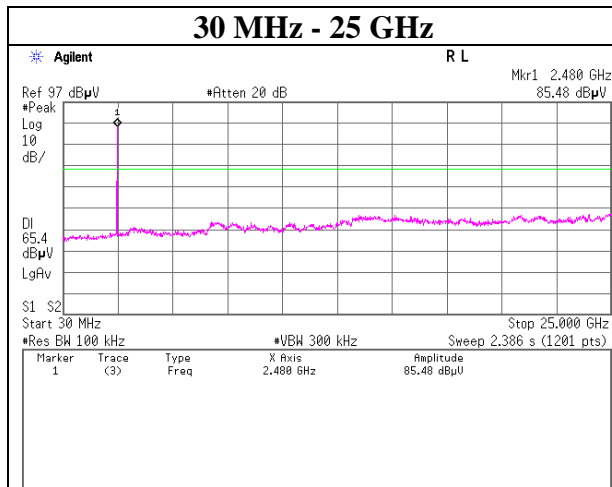
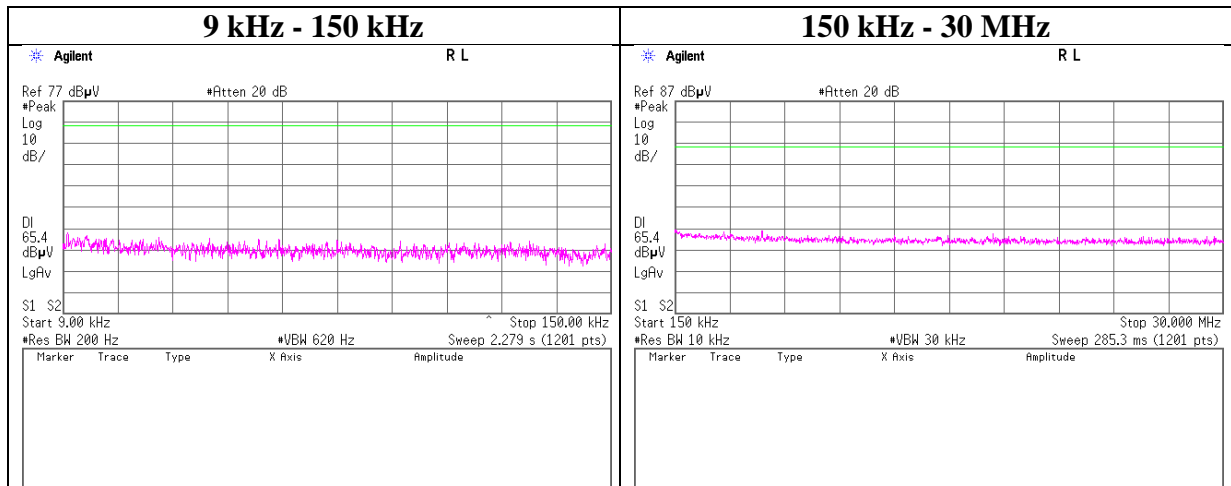
2441 MHz



Conducted Spurious Emission

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10854045S
Date	July 3, 2015
Temperature / Humidity	23 deg. C / 48 % RH
Engineer	Akio Hayashi
Mode	Tx 3DH5

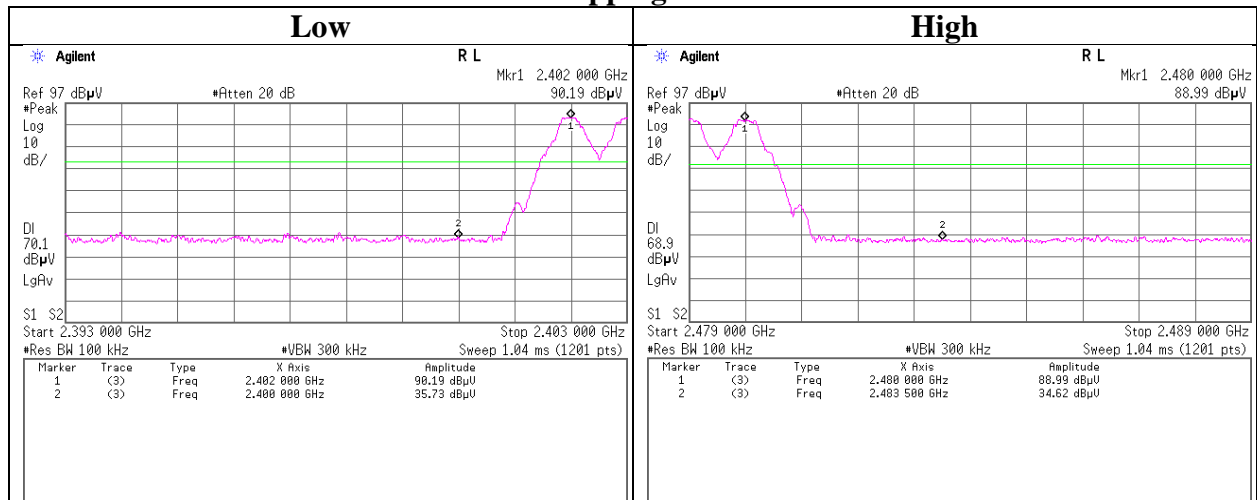
2480 MHz



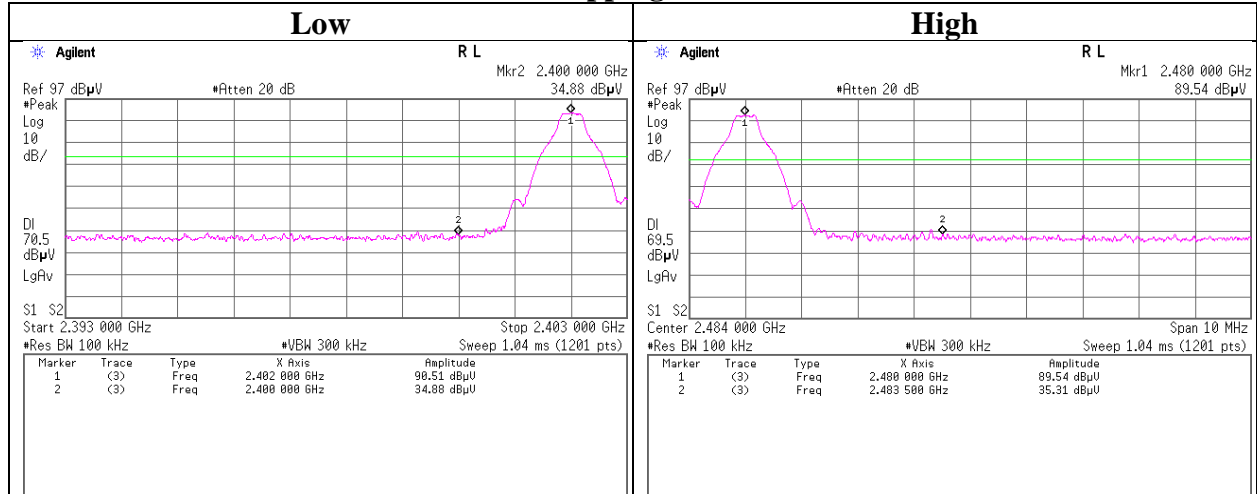
Conducted Emission Band Edge compliance

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10854045S
Date	July 3, 2015
Temperature / Humidity	23 deg. C / 68 % RH
Engineer	Akio Hayashi
Mode	Tx DH5

Hopping On



Hopping Off



UL Japan, Inc.

Shonan EMC Lab.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

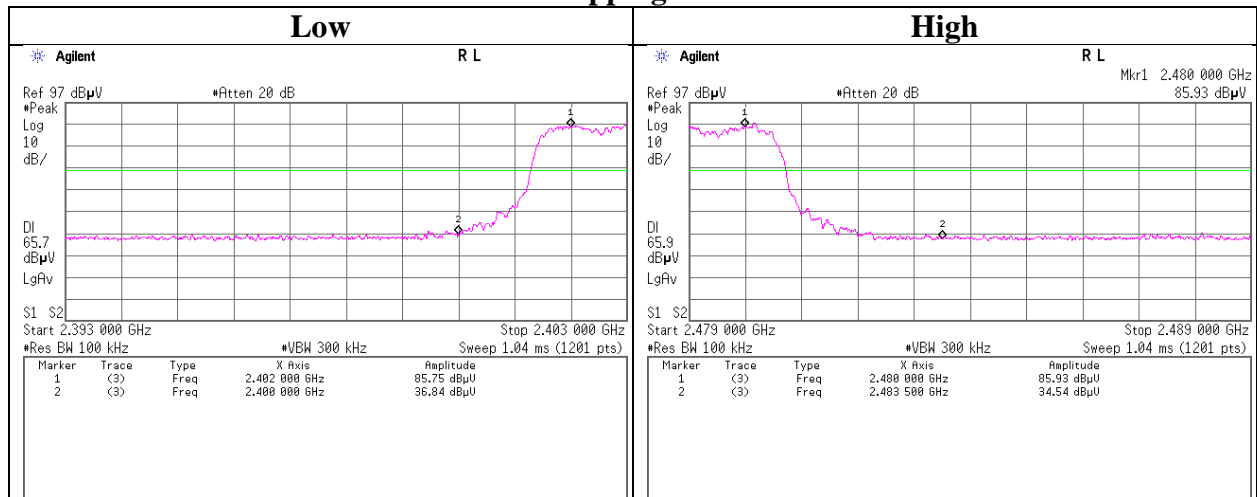
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

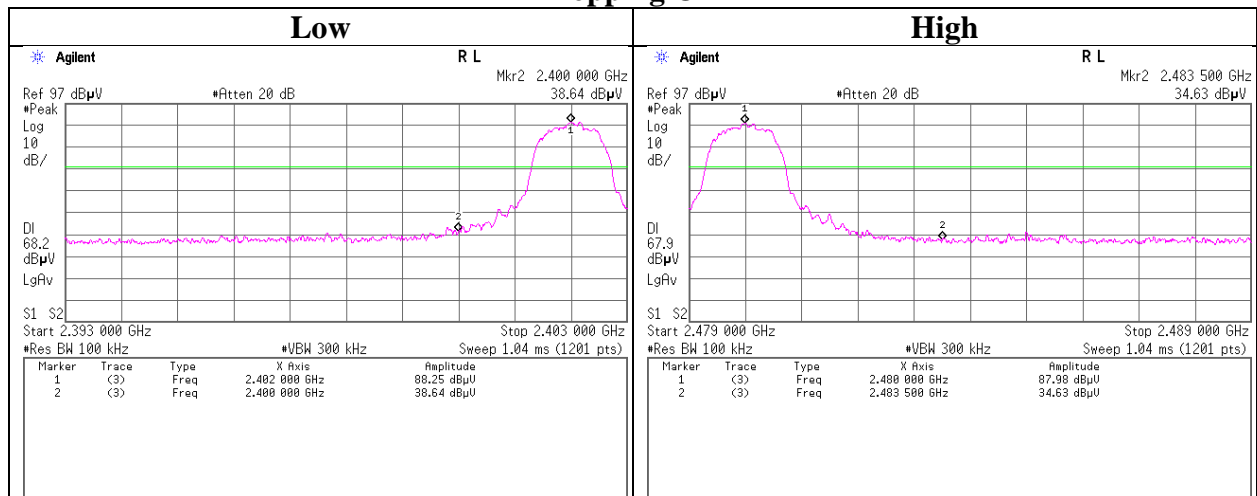
Conducted Emission Band Edge compliance

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10854045S
Date	July 3, 2015
Temperature / Humidity	23 deg. C / 48 % RH
Engineer	Akio Hayashi
Mode	Tx 3DH5

Hopping On



Hopping Off



UL Japan, Inc.

Shonan EMC Lab.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

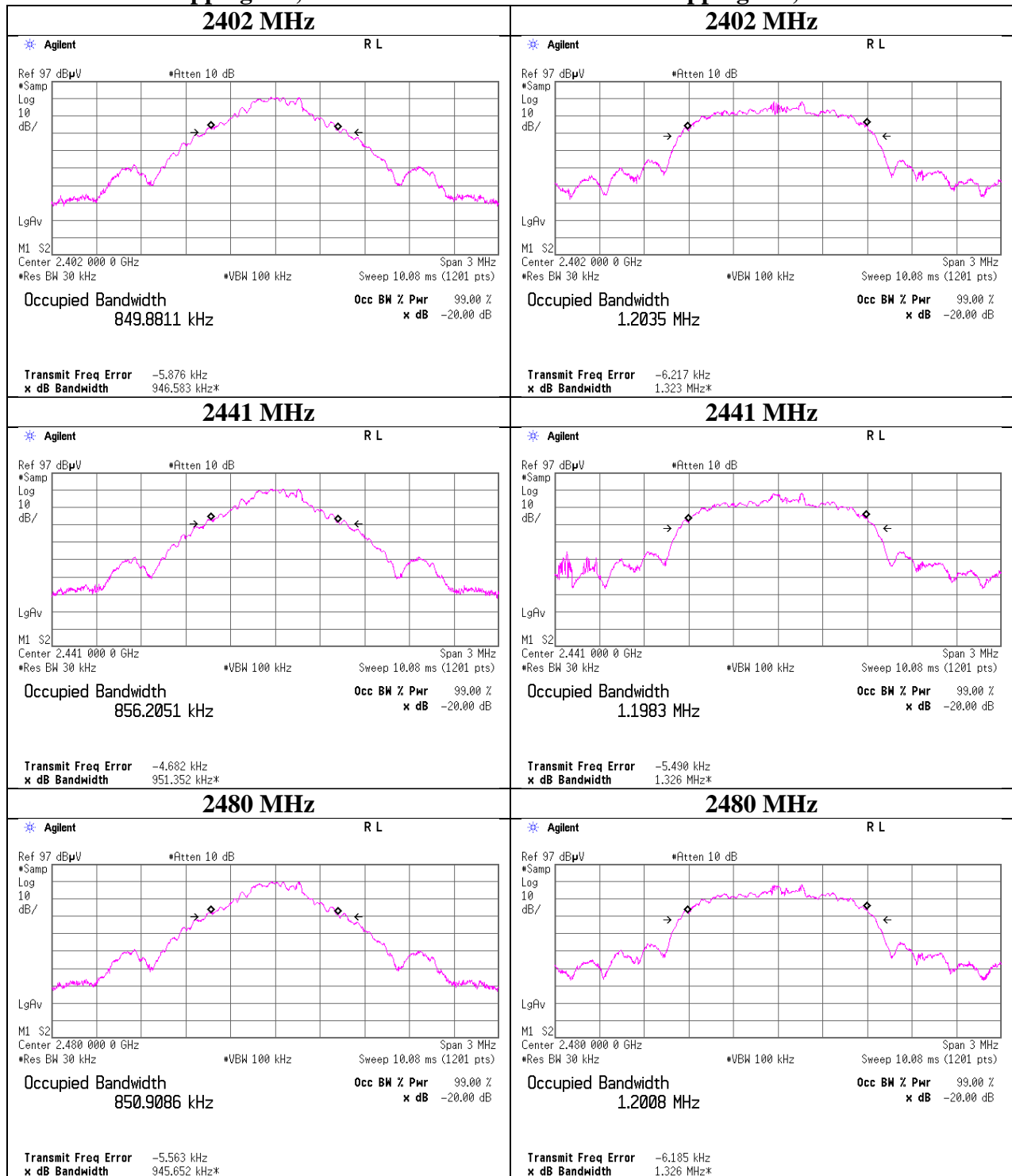
Facsimile : +81 463 50 6401

99% Occupied Bandwidth

Test place	Shonan EMC Lab. No.5 Shielded Room
Report No.	10854045S
Date	June 23, 2015
Temperature / Humidity	23 deg. C / 48 % RH
Engineer	Akio Hayashi
Mode	Tx Hopping Off

Hopping Off, DH5

Hopping Off, 3DH5



UL Japan, Inc.

Shonan EMC Lab.

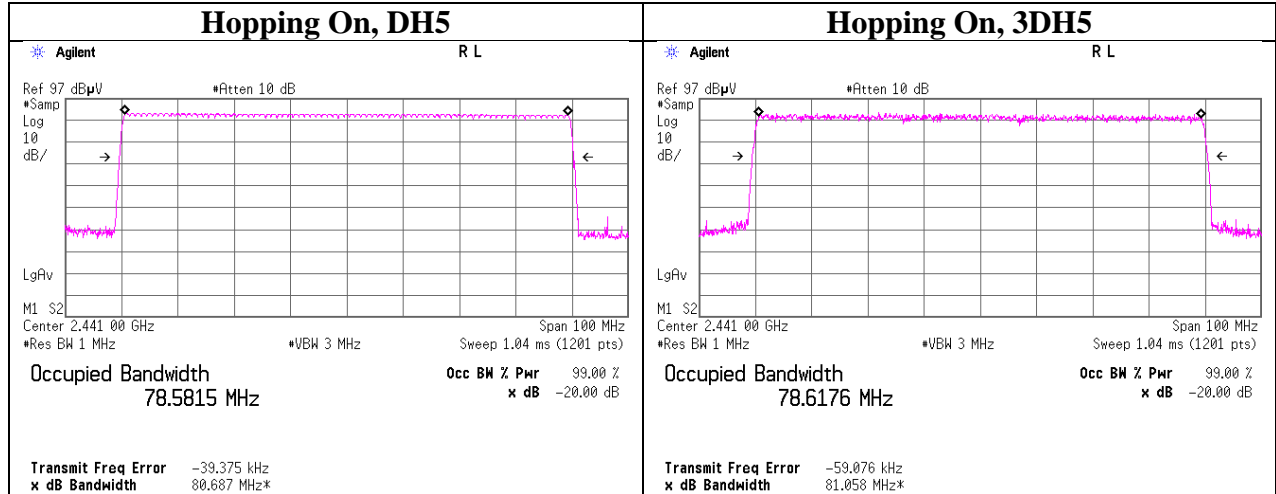
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

99% Occupied Bandwidth

Test place	Shonan EMC Lab. No.5 Shielded Room /
Report No.	10854045S
Date	June 23, 2015
Temperature / Humidity	23 deg. C / 48 % RH
Engineer	Akio Hayashi
Mode	Tx Hopping On



APPENDIX 2: Test instruments

Test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
KAF-04	Pre Amplifier	Agilent	8449B	3008A01600	RE	2015/04/28 * 12
SCC-G05	Coaxial Cable	Junkosha	J12J102207-00	APR-30-15-037	RE	2015/05/11 * 12
SCC-G22	Coaxial Cable	Suhner	SUCOFLEX 104	296199/4	RE	2015/05/19 * 12
SHA-02	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-726	RE	2014/08/12 * 12
SOS-03	Humidity Indicator	A&D	AD-5681	4063325	RE	2014/10/30 * 12
STR-07	Test Receiver	Rohde & Schwarz	ESU26	100484	RE	2014/09/03 * 12
SJM-14	Measure	ASKUL	-	-	RE	-
SAEC-02(SVSWR)	Semi-Anechoic Chamber	TDK	SAEC-02(SVSWR)	2	RE	2014/07/28 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RFLMF)	-	RE	-
SAT10-05	Attenuator(above1GHz)	Agilent	8493C-010	74864	RE	2014/11/21 * 12
SFL-18	Highpass Filter	MICRO-TRONICS	HPM50111	119	RE	2015/04/09 * 12
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM3640	RE	2015/03/17 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2015/03/23 * 12
SCC-G15	Coaxial Cable	Suhner	SUCOFLEX 102	32703/2	RE	2015/03/11 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	RE	2015/03/26 * 12
SAF-02	Pre Amplifier	SONOMA	310N	290212	RE	2015/02/18 * 12
SAT6-02	Attenuator	JFW	50HF-006N	-	RE	2015/02/18 * 12
KAT3-11	Attenuator	JFW IND. INC.	50HF-003N	-	RE	2014/08/27 * 12
SBA-02	Biconical Antenna	Schwarzbeck	BBA9106	91032665	RE	2014/11/22 * 12
SCC-B1/B3/B5/B7/B8/B13/SRSE-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	RE	2015/04/17 * 12
SCC-B2/B4/B6/B7/B8/B13/SRSE-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	RE	2015/04/17 * 12
SLA-02	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP9108-A0893	RE	2014/11/22 * 12
SAEC-02(NSA)	Semi-Anechoic Chamber	TDK	SAEC-02(NSA)	2	RE	2014/07/08 * 12

UL Japan, Inc.

Shonan EMC Lab.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2014/12/24 * 12
SPM-07	Power Meter	Agilent	8990B	MY510027 2	AT	2015/04/02 * 12
SPSS-04	Power sensor	Agilent	N1923A	MY532600 9	AT	2015/04/02 * 12
SCC-G13	Coaxial Cable	Suhner	SUCOFLEX 102	31599/2	AT	2015/03/11 * 12
SAT10-10	Attenuator	Weinschel Corp.	54A-10	37584	AT	2015/04/09 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY482501 06	AT	2015/03/26 * 12
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY482501 52	AT	2015/02/24 * 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 test
AT: Antenna Terminal Conducted test**

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