



RADIO TEST REPORT

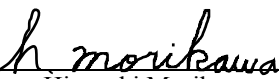
Test Report No. : 11697713S-A-R2

Applicant : JVC KENWOOD Corporation
Type of Equipment : Display Audio
Model No. : MXLR16KLG4
FCC ID : IOMK1027
Test regulation : FCC Part 15 Subpart C: 2016
Test item : Radiated Spurious Emission
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)
7. This report is a revised version of 11697713S-A-R1. 11697713S-A-R1 is replaced with this report.

Date of test: April 22 to 24, 2017

Representative test engineer:


Hiroyuki Morikawa
Engineer
Consumer Technology Division

Approved by:


Akira Sato
Engineer
Consumer Technology Division



- ☐ 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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13-EM-F0429

REVISION HISTORY

Original Test Report No.: 11697713S-A

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SECTION 1: Customer information

Company Name	:	JVC KENWOOD Corporation
Address	:	2967-3, Ishikawa-machi, Hachioji, Tokyo 192-8525 Japan
Telephone Number	:	+81-42-646-5525
Facsimile Number	:	+81-42-646-7801
Contact Person	:	Hitoshi Aiso

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

2.1 Identification of E.U.T.

Type of Equipment	:	Display Audio
Model No.	:	MXLR16KLG4
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 12 V
Receipt Date of Sample	:	March 13, 2017
Country of Mass-production	:	China
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: MXLR16KLG4 (referred to as the EUT in this report) is a Display Audio.

General Specification

Clock frequency(ies) in the system	:	26 MHz, 24 MHz, 62.4 MHz, 28.224 MHz, 32.768 kHz, 12 MHz, 12.58 MHz, 12.288 MHz, 27 MHz, 8 MHz
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Radio Specification

Radio Type	:	Transceiver
Frequency of Operation	:	2402 MHz - 2480 MHz
Modulation	:	FHSS
Power Supply (radio part input)	:	DC 3.3 V
Antenna type	:	Pattern Antenna
Antenna Gain	:	+1 dBi

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C
FCC Part 15 final revised on November 14, 2016 and effective December 14, 2016

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

* Also the EUT complies with FCC Part 15 Subpart B.

3.2 Procedures and results

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.10-2013 6. Standard test methods 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 (b)	See data.	N/A	*2)
20dB Bandwidth	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1) IC: RSS-247 5.1 (a)		N/A	*2)
Number of Hopping Frequency	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1)(iii) IC: RSS-247 5.1 (d)		N/A	*2)
Dwell time	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1)(iii) IC: RSS-247 5.1 (d)		N/A	*2)
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 (b)		N/A	*2)
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	5.6 dB 156.247 MHz, QP, Horizontal, Tx 2480 MHz 3-DH5	Complied	Conducted/ Radiated (above 30 MHz) *3)

Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420.

*1) The test is not applicable since the EUT has no AC mains.

*2) For the items, refer to the test report: 11238416S-A. The test was performed on the module which is the same as the one installed in the EUT.

*3) Radiated test was selected over 30 MHz based on section 15.247(d).

* In case any questions arise about test procedure, ANSI C63.10: 2013 is also referred.

FCC Part 15.31 (e)

The EUT provides stable voltage (DC3.3 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 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.

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3.3 Addition to standard

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 $k=2$.

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Item	Frequency range	Uncertainty (+/-)				
		No. 1 SAC / SR	No. 2 SAC / SR	No. 3 SAC / SR	No. 4 SAC / SR	No. 5,6,8 SR
Conducted emission (AC Mains) LISN	150 kHz-30 MHz	2.6 dB	2.5 dB	2.6 dB	2.5 dB	2.5 dB
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	3.1 dB	3.1 dB	3.1 dB	-	-
	30 MHz-200 MHz	4.6 dB	4.4 dB	4.6 dB	-	-
	200 MHz-1 GHz	5.8 dB	5.7 dB	5.8 dB	-	-
	1 GHz-13 GHz	4.9 dB	4.9 dB	4.9 dB	-	-
Radiated emission (Measurement distance: 1 m)	13 GHz-18 GHz	4.6 dB	4.6 dB	4.6 dB	-	-
	18 GHz-40 GHz	4.9 dB	4.9 dB	4.9 dB	-	-

SAC=Semi-Anechoic Chamber

SR= Shielded Room is applied besides radiated emission

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	10 m
No.2 Semi-anechoic chamber	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.3 Semi-anechoic chamber	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5 m
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.

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

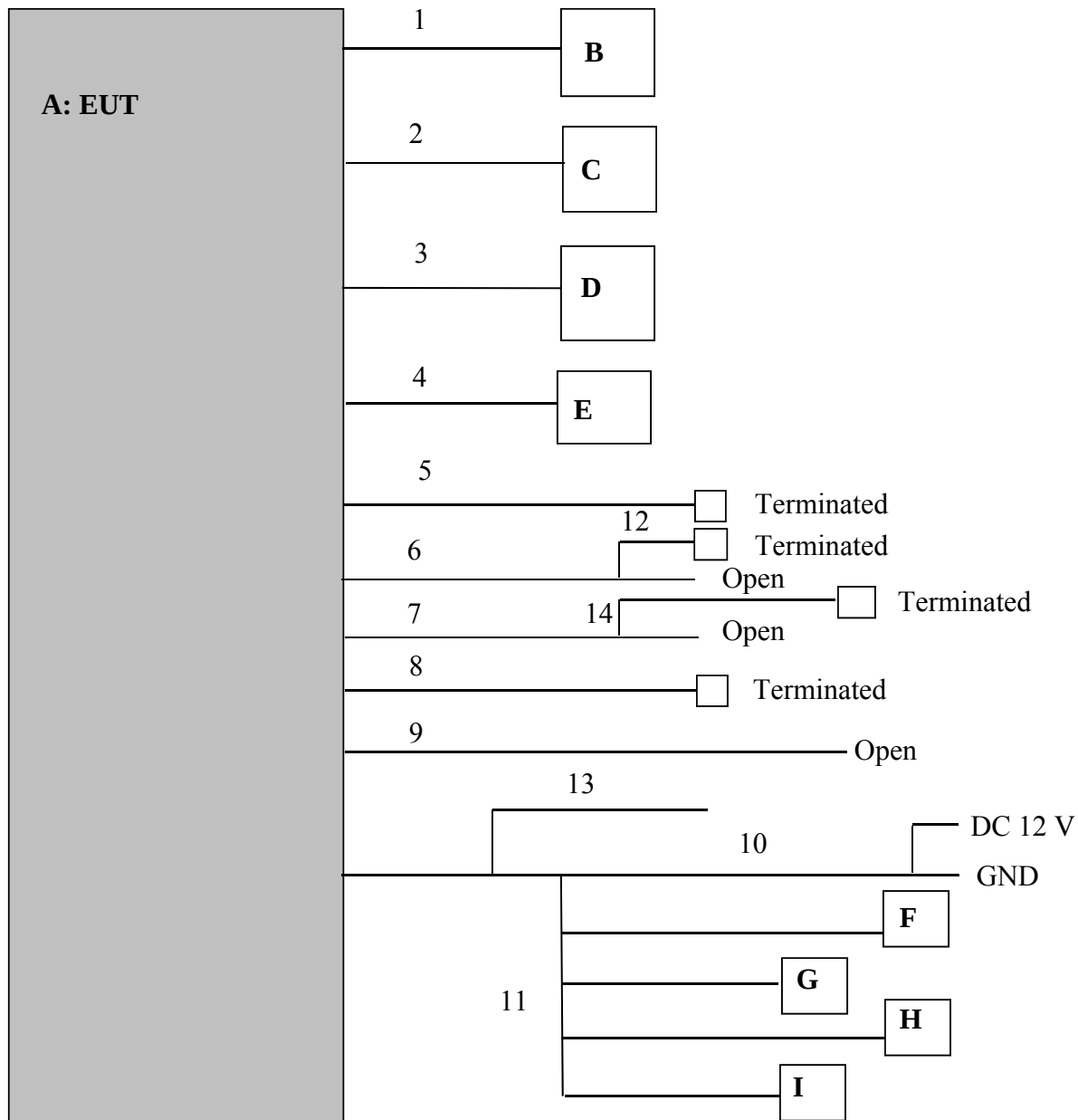
4.1 Operating Mode(s)

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

Details of Operating Mode(s)

Test Item	Mode	Tested frequency
Spurious Emission(Radiated)	Tx (Hopping Off) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload length. *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 the test items based on Bluetooth Core specification. *EUT has the power settings by the software as follows; Power settings: BDR: Ext.=255, Int.=42 EDR: Ext.=255, Int.=48 Software: Blue Test 3 ver.2.5.0.93 *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.

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Display Audio	MXLR16KLG4	77200004	JVC KENWOOD	EUT
B	USB memory	JetFlash 128MB	-	Transcend	-
C	USB memory	JF V33/2GHz	526394 0345	Transcend	-
D	Mobile Phone	SO-01F Xperia Z1	CB5125QLDK	Sony	-
E	GPS antenna	8751A085	68000044	JVC KENWOOD	-
F	Speaker	KFC-RS160	-	KENWOOD	-
G	Speaker	KFC-RS160	-	KENWOOD	-
H	Speaker	KFC-RS160	-	KENWOOD	-
I	Speaker	KFC-RS160	-	KENWOOD	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	USB	2.0	Shielded	Shielded	-
2	USB	2.0	Shielded	Shielded	-
3	HDMI	0.1+2.0+1.5	Shielded	Shielded	-
4	GPS antenna	2.0	Shielded	Shielded	-
5	FM antenna	4.85	Shielded	Shielded	-
6	Signal	2.4	Unshielded	Unshielded	-
7	Signal	2.4	Unshielded	Unshielded	-
8	Signal	1.7	Shielded	Shielded	-
9	Signal	2.2	Unshielded	Unshielded	-
10	DC	2.2	Unshielded	Unshielded	-
11	Speaker	2.0+1.9	Unshielded	Unshielded	-
12	CAMERA IN	3.0	Shielded	Shielded	-
13	Signal	2.0	Unshielded	Unshielded	-
14	Signal	3.0	Shielded	Shielded	-

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SECTION 5: Radiated Spurious Emission

Test Procedure

[For below 1 GHz]

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 Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

[For above 1 GHz]

EUT was placed on a urethane platform of nominal size, 0.5 m by 0.5 m, raised 1.5 m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with absorbent materials lined on a ground plane.

The height of the measuring antenna varied between 1 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 200 MHz	200 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*2) (1 GHz – 13 GHz), 1 m*3) (13 GHz – 26.5 GHz)		3 m*2) (1 GHz – 13 GHz), 1 m*3) (13 GHz – 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: $20 \times \log(3.81 \text{ m}/3.0 \text{ m}) = 2.08 \text{ dB}$

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

The EUT was set at 16 degree as a 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 MHz - 26.5 GHz
Test data : APPENDIX
Test result : Pass

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APPENDIX 1: Test data

Radiated Spurious Emission

Report No. 11697713S-A-R2
Test place Shonan EMC Lab. No.1 Semi Anechoic Chamber
Date April 22, 2017 April 24, 2017
Temperature / Humidity 24 deg. C / 38 % RH 26 deg. C / 40 % RH
Engineer Kazutaka Takeyama Hiroyuki Morikawa
(1 GHz -26.5 GHz) (30 MHz- 1000 MHz)
Mode Tx, Hopping Off, 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.	156.250	QP	43.86	15.16	8.91	31.77	0.00	36.16	43.50	7.3	218	131	
Hori.	162.000	QP	43.19	15.42	8.95	31.77	0.00	35.79	43.50	7.7	195	122	
Hori.	480.033	QP	40.06	17.31	8.06	31.86	0.00	33.57	46.00	12.4	100	188	
Hori.	648.000	QP	32.62	19.43	8.83	32.02	0.00	28.86	46.00	17.1	103	288	
Hori.	864.352	QP	33.06	21.59	9.82	31.52	0.00	32.95	46.00	13.0	116	102	
Hori.	1601.966	PK	48.49	25.14	13.46	41.05	2.08	48.12	73.90	25.7	148	85	
Hori.	2390.000	PK	47.21	27.21	14.15	40.85	2.08	49.80	73.90	24.1	176	245	
Hori.	4804.000	PK	61.31	31.13	6.64	41.86	2.08	59.30	73.90	14.6	136	209	
Hori.	7206.000	PK	46.42	36.24	8.07	41.18	2.08	51.63	73.90	22.2	150	0	
Hori.	9608.000	PK	45.57	38.13	8.98	40.59	2.08	54.17	73.90	19.7	150	0	
Hori.	1601.966	AV	38.06	25.14	13.46	41.05	2.08	37.69	53.90	16.2	148	85	
Hori.	2390.000	AV	34.75	27.21	14.15	40.85	2.08	37.34	53.90	16.5	176	245	
Vert.	156.255	QP	38.41	15.16	8.91	31.77	0.00	30.71	43.50	12.7	100	209	
Vert.	161.998	QP	39.16	15.42	8.95	31.77	0.00	31.76	43.50	11.7	100	199	
Vert.	480.024	QP	38.13	17.31	8.06	31.86	0.00	31.64	46.00	14.3	132	131	
Vert.	617.398	QP	33.92	19.25	8.67	31.98	0.00	29.86	46.00	16.1	127	287	
Vert.	864.354	QP	34.52	21.59	9.82	31.52	0.00	34.41	46.00	11.5	100	279	
Vert.	1602.053	PK	48.67	25.14	13.46	41.05	2.08	48.30	73.90	25.6	116	171	
Vert.	2390.000	PK	46.96	27.21	14.15	40.85	2.08	49.55	73.90	24.3	187	346	
Vert.	4804.000	PK	58.23	31.13	6.64	41.86	2.08	56.22	73.90	17.6	100	119	
Vert.	7206.000	PK	46.34	36.24	8.07	41.18	2.08	51.55	73.90	22.3	150	0	
Vert.	9608.000	PK	45.44	38.13	8.98	40.59	2.08	54.04	73.90	19.8	150	0	
Vert.	1602.053	AV	39.02	25.14	13.46	41.05	2.08	38.65	53.90	15.2	116	171	
Vert.	2390.000	AV	34.71	27.21	14.15	40.85	2.08	37.30	53.90	16.6	187	346	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.81\text{ m} / 3.0\text{ m}) = 2.08\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4804.000	AV	57.06	31.13	6.64	41.86	-24.67	2.08	30.38	53.90	23.5	
Hori.	7206.000	AV	34.82	36.24	8.07	41.18	-24.67	2.08	15.36	53.90	38.5	
Hori.	9608.000	AV	33.68	38.13	8.98	40.59	-24.67	2.08	17.61	53.90	36.3	
Vert.	4804.000	AV	53.15	31.13	6.64	41.86	-24.67	2.08	26.47	53.90	27.4	
Vert.	7206.000	AV	34.77	36.24	8.07	41.18	-24.67	2.08	15.31	53.90	38.6	
Vert.	9608.000	AV	33.90	38.13	8.98	40.59	-24.67	2.08	17.83	53.90	36.1	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.81\text{ m} / 3.0\text{ m}) = 2.08\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Dwell (time) factor refer to test report: 11238416S "Dwell time factor Calculation chart" sheet.

*Firmware and the module are the same as an original report

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	90.31	27.25	14.16	40.84	2.08	92.96	-	-	Carrier
Hori.	2399.530	PK	43.47	27.24	14.15	40.84	2.08	46.10	72.96	26.9	
Hori.	2400.000	PK	44.57	27.25	14.15	40.84	2.08	47.21	72.96	25.8	
Vert.	2402.000	PK	88.02	27.25	14.16	40.84	2.08	90.67	-	-	Carrier
Vert.	2399.534	PK	41.00	27.24	14.15	40.84	2.08	43.63	70.67	27.0	
Vert.	2400.000	PK	42.46	27.25	14.15	40.84	2.08	45.10	70.67	25.6	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.81\text{ m} / 3.0\text{ m}) = 2.08\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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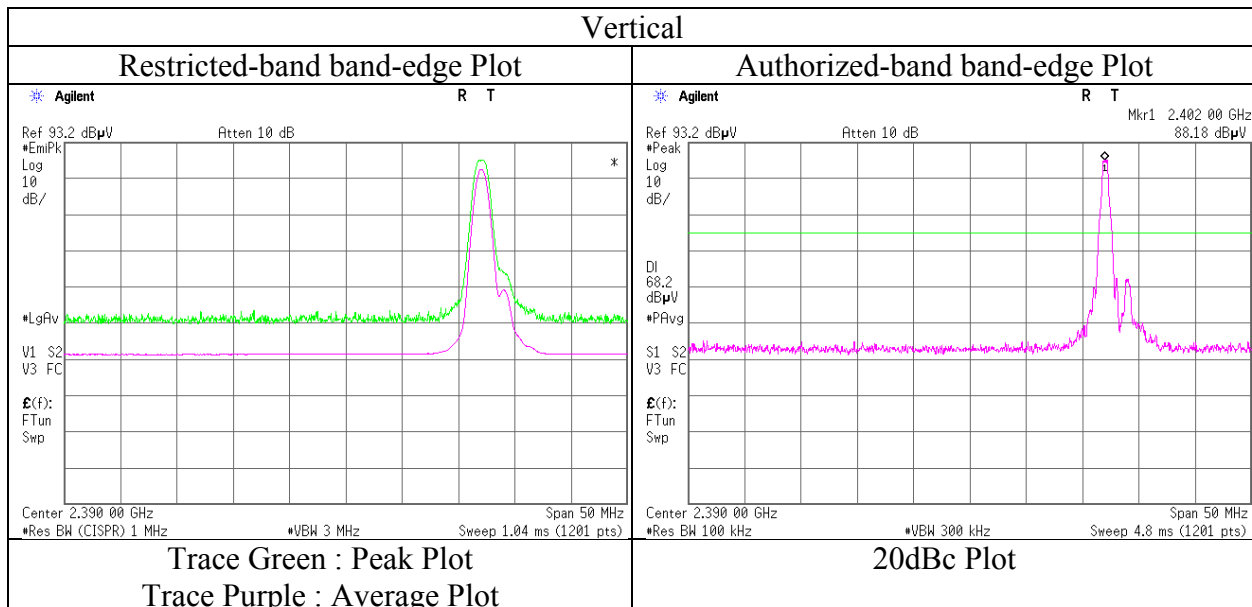
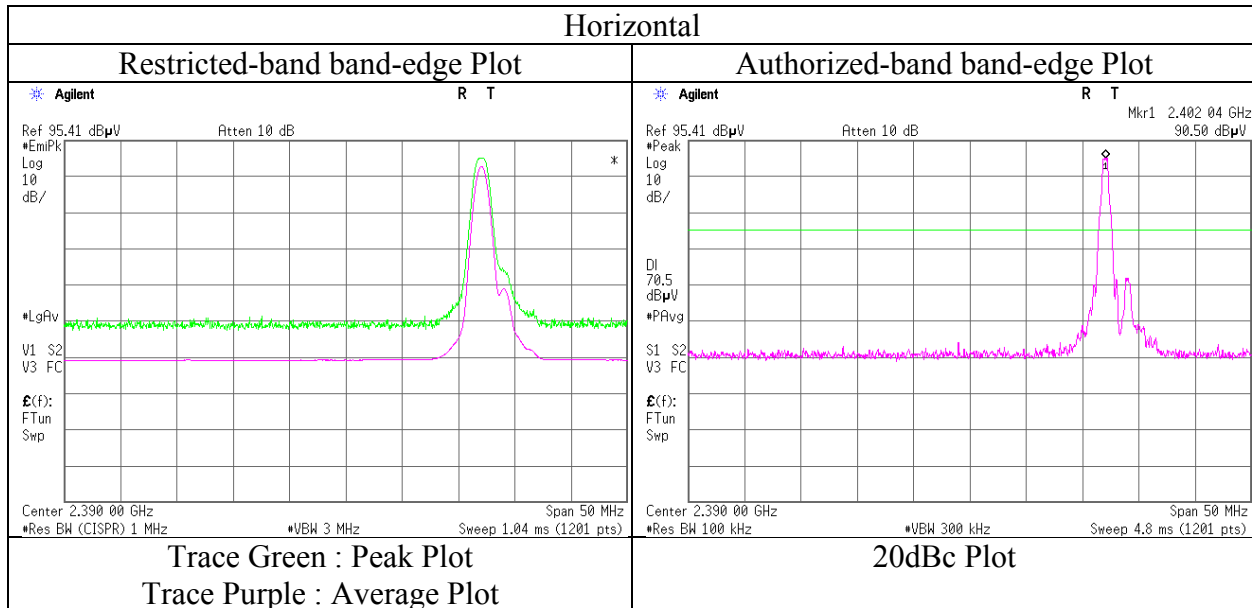
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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	11697713S-A-R2
Test place	Shonan EMC Lab. No.1 Semi Anechoic Chamber
Date	April 22, 2017 April 24, 2017
Temperature / Humidity	24 deg. C / 38 % RH 26 deg. C / 40 % RH
Engineer	Kazutaka Takeyama Hiroyuki Morikawa
	(1 GHz -26.5 GHz) (30 MHz- 1000 MHz)
Mode	Tx, Hopping Off, DH5 2402 MHz



* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

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Date April 22, 2017 April 24, 2017
Temperature / Humidity 24 deg. C / 38 % RH 26 deg. C / 40 % RH
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(1 GHz -26.5 GHz) (30 MHz- 1000 MHz)
Mode Tx, Hopping Off, 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.	156.247	QP	44.62	15.16	8.91	31.77	0.00	36.92	43.50	6.5	221	131	
Hori.	161.995	QP	42.46	15.42	8.95	31.77	0.00	35.06	43.50	8.4	199	127	
Hori.	480.049	QP	40.27	17.31	8.06	31.86	0.00	33.78	46.00	12.2	100	188	
Hori.	648.002	QP	32.11	19.43	8.83	32.02	0.00	28.35	46.00	17.6	106	289	
Hori.	843.756	QP	23.73	21.33	9.72	31.62	0.00	23.16	46.00	22.8	150	204	
Hori.	864.350	QP	33.16	21.59	9.82	31.52	0.00	33.05	46.00	12.9	109	101	
Hori.	960.002	QP	29.20	22.38	10.19	30.84	0.00	30.93	53.90	22.9	187	166	
Hori.	1626.767	PK	49.25	25.19	13.49	41.05	2.08	48.96	73.90	24.9	142	75	
Hori.	4882.000	PK	60.85	31.29	6.72	41.76	2.08	59.18	73.90	14.7	128	210	
Hori.	7323.000	PK	46.74	36.41	8.20	41.27	2.08	52.16	73.90	21.7	150	0	
Hori.	9764.000	PK	45.51	38.36	9.09	40.62	2.08	54.42	73.90	19.4	150	0	
Hori.	1626.767	AV	40.70	25.19	13.49	41.05	2.08	40.41	53.90	13.4	142	75	
Vert.	156.242	QP	38.48	15.16	8.91	31.77	0.00	30.78	43.50	12.7	100	211	
Vert.	161.998	QP	38.75	15.42	8.95	31.77	0.00	31.35	43.50	12.1	100	196	
Vert.	480.015	QP	38.16	17.31	8.06	31.86	0.00	31.67	46.00	14.3	121	129	
Vert.	843.747	QP	28.71	21.33	9.72	31.62	0.00	28.14	46.00	17.8	100	318	
Vert.	864.357	QP	34.52	21.59	9.82	31.52	0.00	34.41	46.00	11.5	100	279	
Vert.	1626.740	PK	49.02	25.19	13.49	41.05	2.08	48.73	73.90	25.1	173	180	
Vert.	4882.000	PK	58.79	31.29	6.72	41.76	2.08	57.12	73.90	16.7	105	128	
Vert.	7323.000	PK	46.70	36.41	8.20	41.27	2.08	52.12	73.90	21.7	150	0	
Vert.	9764.000	PK	45.42	38.36	9.09	40.62	2.08	54.33	73.90	19.5	150	0	
Vert.	1626.740	AV	39.62	25.19	13.49	41.05	2.08	39.33	53.90	14.5	173	180	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.81\text{ m} / 3.0\text{ m}) = 2.08\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4882.000	AV	56.01	31.29	6.72	41.76	-24.67	2.08	29.67	53.90	24.2	
Hori.	7323.000	AV	35.11	36.41	8.20	41.27	-24.67	2.08	15.86	53.90	38.0	
Hori.	9764.000	AV	34.17	38.36	9.09	40.62	-24.67	2.08	18.41	53.90	35.5	
Vert.	4882.000	AV	53.98	31.29	6.72	41.76	-24.67	2.08	27.64	53.90	26.3	
Vert.	7323.000	AV	35.34	36.41	8.20	41.27	-24.67	2.08	16.09	53.90	37.8	
Vert.	9764.000	AV	34.41	38.36	9.09	40.62	-24.67	2.08	18.65	53.90	35.3	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.81\text{ m} / 3.0\text{ m}) = 2.08\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Dwell (time) factor refer to test report: 11238416S "Dwell time factor Calculation chart" sheet.

*Firmware and the module are the same as an original report

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Radiated Spurious Emission

Report No. 11697713S-A-R2
Test place Shonan EMC Lab. No.1 Semi Anechoic Chamber
Date April 22, 2017 April 24, 2017
Temperature / Humidity 24 deg. C / 38 % RH 26 deg. C / 40 % RH
Engineer Kazutaka Takeyama Hiroyuki Morikawa
(1 GHz -26.5 GHz) (30 MHz- 1000 MHz)
Mode Tx, Hopping Off, 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.	156.247	QP	40.84	15.16	8.91	31.77	0.00	33.14	43.50	10.3	209	133	
Hori.	161.997	QP	38.56	15.42	8.95	31.77	0.00	31.16	43.50	12.3	199	117	
Hori.	312.507	QP	35.67	13.79	6.89	31.76	0.00	24.59	46.00	21.4	116	162	
Hori.	648.002	QP	32.80	19.43	8.83	32.02	0.00	29.04	46.00	16.9	102	297	
Hori.	864.353	QP	32.06	21.59	9.82	31.52	0.00	31.95	46.00	14.0	111	107	
Hori.	959.994	QP	29.05	22.38	10.19	30.84	0.00	30.78	46.00	15.2	183	171	
Hori.	1652.695	PK	48.76	25.24	13.53	41.05	2.08	48.56	73.90	25.3	135	339	
Hori.	2483.500	PK	46.21	27.52	14.22	40.81	2.08	49.22	73.90	24.6	160	236	
Hori.	4960.000	PK	55.30	31.45	6.79	41.65	2.08	53.97	73.90	19.9	176	55	
Hori.	7440.000	PK	47.10	36.57	8.35	41.36	2.08	52.74	73.90	21.1	150	0	
Hori.	9920.000	PK	45.89	38.58	9.21	40.66	2.08	55.10	73.90	18.8	150	0	
Hori.	1652.695	AV	39.31	25.24	13.53	41.05	2.08	39.11	53.90	14.7	135	339	
Hori.	2483.500	AV	34.89	27.52	14.22	40.81	2.08	37.90	53.90	16.0	160	236	
Vert.	156.250	QP	35.09	15.16	8.91	31.77	0.00	27.39	43.50	16.1	226	176	
Vert.	161.997	QP	36.18	15.42	8.95	31.77	0.00	28.78	43.50	14.7	194	173	
Vert.	843.745	QP	28.54	21.33	9.72	31.62	0.00	27.97	46.00	18.0	100	317	
Vert.	864.347	QP	34.35	21.59	9.82	31.52	0.00	34.24	46.00	11.7	100	279	
Vert.	906.241	QP	23.61	22.07	10.02	31.29	0.00	24.41	46.00	21.5	113	149	
Vert.	1652.647	PK	49.46	25.24	13.53	41.05	2.08	49.26	73.90	24.6	127	166	
Vert.	2483.500	PK	46.26	27.52	14.22	40.81	2.08	49.27	73.90	24.6	171	342	
Vert.	4960.000	PK	52.10	31.45	6.79	41.65	2.08	50.77	73.90	23.1	177	199	
Vert.	7440.000	PK	46.56	36.57	8.35	41.36	2.08	52.20	73.90	21.7	150	0	
Vert.	9920.000	PK	45.14	38.58	9.21	40.66	2.08	54.35	73.90	19.5	150	0	
Vert.	1652.647	AV	41.13	25.24	13.53	41.05	2.08	40.93	53.90	12.9	127	166	
Vert.	2483.500	AV	34.40	27.52	14.22	40.81	2.08	37.41	53.90	16.4	171	342	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.81\text{ m} / 3.0\text{ m}) = 2.08\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4960.000	AV	49.17	31.45	6.79	41.65	-24.67	2.08	23.17	53.90	30.7	
Hori.	7440.000	AV	35.59	36.57	8.35	41.36	-24.67	2.08	16.56	53.90	37.3	
Hori.	9920.000	AV	34.04	38.58	9.21	40.66	-24.67	2.08	18.58	53.90	35.3	
Vert.	4960.000	AV	45.07	31.45	6.79	41.65	-24.67	2.08	19.07	53.90	34.8	
Vert.	7440.000	AV	35.56	36.57	8.35	41.36	-24.67	2.08	16.53	53.90	37.4	
Vert.	9920.000	AV	34.24	38.58	9.21	40.66	-24.67	2.08	18.78	53.90	35.1	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.81\text{ m} / 3.0\text{ m}) = 2.08\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Dwell (time) factor refer to test report: 11238416S "Dwell time factor Calculation chart" sheet.

*Firmware and the module are the same as an original report

UL Japan, Inc.

Shonan EMC Lab.

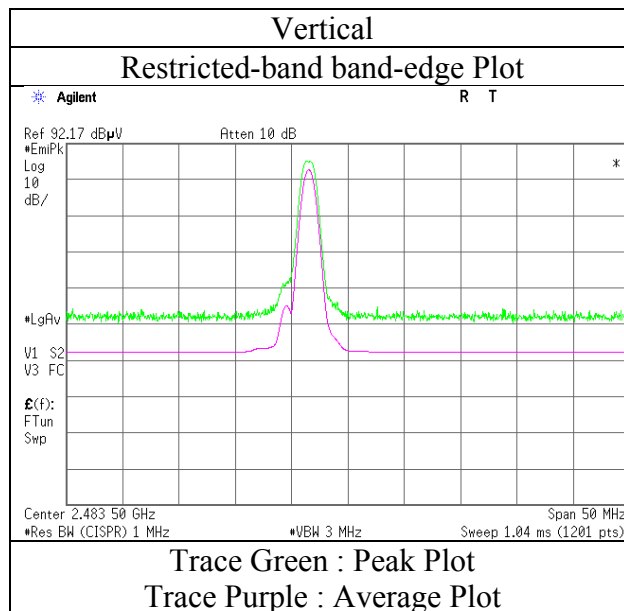
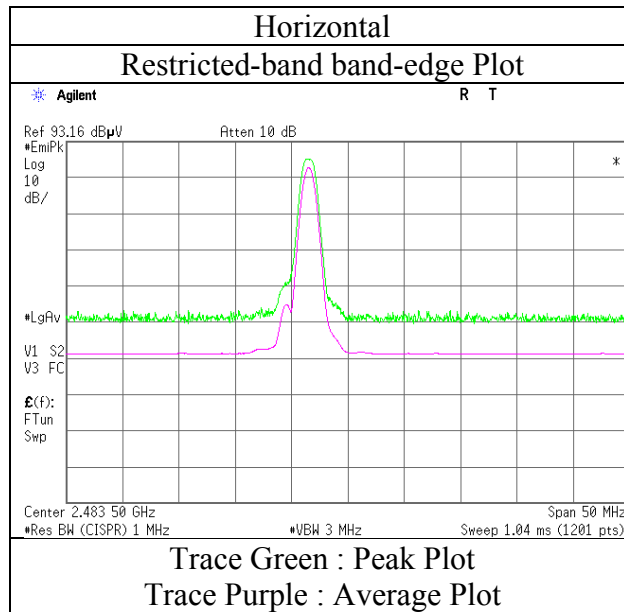
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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	11697713S-A-R2	
Test place	Shonan EMC Lab. No.1 Semi Anechoic Chamber	
Date	April 22, 2017	April 24, 2017
Temperature / Humidity	24 deg. C / 38 % RH	26 deg. C / 40 % RH
Engineer	Kazutaka Takeyama	Hiroyuki Morikawa
	(1 GHz -26.5 GHz)	(30 MHz- 1000 MHz)
Mode	Tx, Hopping Off, DH5 2480 MHz	



* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No. 11697713S-A-R2
Test place Shonan EMC Lab. No.1 Semi Anechoic Chamber
Date April 22, 2017 April 24, 2017
Temperature / Humidity 24 deg. C / 38 % RH 26 deg. C / 40 % RH
Engineer Kazutaka Takeyama Hiroyuki Morikawa
(1 GHz -26.5 GHz) (30 MHz- 1000 MHz)
Mode Tx, Hopping Off, 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.	156.242	QP	42.74	15.16	8.91	31.77	0.00	35.04	43.50	8.4	213	123	
Hori.	161.998	QP	39.82	15.42	8.95	31.77	0.00	32.42	43.50	11.0	191	252	
Hori.	480.050	QP	39.95	17.31	8.06	31.86	0.00	33.46	46.00	12.5	100	186	
Hori.	648.006	QP	32.42	19.43	8.83	32.02	0.00	28.66	46.00	17.3	101	291	
Hori.	843.738	QP	24.32	21.33	9.72	31.62	0.00	23.75	46.00	22.2	100	113	
Hori.	864.350	QP	32.88	21.59	9.82	31.52	0.00	32.77	46.00	13.2	112	95	
Hori.	959.641	QP	29.94	22.37	10.19	30.85	0.00	31.65	46.00	14.3	150	147	
Hori.	1601.969	PK	47.59	25.14	13.46	41.05	2.08	47.22	73.90	26.6	153	90	
Hori.	1602.027	PK	48.50	25.14	13.46	41.05	2.08	48.13	73.90	25.7	138	162	
Hori.	2390.000	PK	47.35	27.21	14.15	40.85	2.08	49.94	73.90	23.9	174	244	
Hori.	4804.000	PK	57.02	31.13	6.64	41.86	2.08	55.01	73.90	18.8	179	208	
Hori.	7206.000	PK	46.68	36.24	8.07	41.18	2.08	51.89	73.90	22.0	150	0	
Hori.	9608.000	PK	44.23	38.13	8.98	40.59	2.08	52.83	73.90	21.0	150	0	
Hori.	1601.969	AV	38.25	25.14	13.46	41.05	2.08	37.88	53.90	16.0	153	90	
Hori.	1602.027	AV	39.53	25.14	13.46	41.05	2.08	39.16	53.90	14.7	138	162	
Hori.	2390.000	AV	34.75	27.21	14.15	40.85	2.08	37.34	53.90	16.5	174	244	
Vert.	156.245	QP	36.59	15.16	8.91	31.77	0.00	28.89	43.50	14.6	232	176	
Vert.	161.998	QP	37.12	15.42	8.95	31.77	0.00	29.72	43.50	13.7	100	199	
Vert.	843.745	QP	28.91	21.33	9.72	31.62	0.00	28.34	46.00	17.6	100	327	
Vert.	864.352	QP	34.65	21.59	9.82	31.52	0.00	34.54	46.00	11.4	100	279	
Vert.	2390.000	PK	45.82	27.21	14.15	40.85	2.08	48.41	73.90	25.4	124	353	
Vert.	4804.000	PK	55.93	31.13	6.64	41.86	2.08	53.92	73.90	19.9	100	123	
Vert.	7206.000	PK	46.15	36.24	8.07	41.18	2.08	51.36	73.90	22.5	150	0	
Vert.	9608.000	PK	44.76	38.13	8.98	40.59	2.08	53.36	73.90	20.5	150	0	
Vert.	2390.000	AV	34.19	27.21	14.15	40.85	2.08	36.78	53.90	17.1	124	353	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.81\text{ m} / 3.0\text{ m}) = 2.08\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4804.000	AV	47.95	31.13	6.64	41.86	-24.63	2.08	21.31	53.90	32.6	
Hori.	7206.000	AV	34.85	36.24	8.07	41.18	-24.63	2.08	15.43	53.90	38.5	
Hori.	9608.000	AV	33.80	38.13	8.98	40.59	-24.63	2.08	17.77	53.90	36.1	
Vert.	4804.000	AV	46.46	31.13	6.64	41.86	-24.63	2.08	19.82	53.90	34.1	
Vert.	7206.000	AV	34.89	36.24	8.07	41.18	-24.63	2.08	15.47	53.90	38.4	
Vert.	9608.000	AV	33.72	38.13	8.98	40.59	-24.63	2.08	17.69	53.90	36.2	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.81\text{ m} / 3.0\text{ m}) = 2.08\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Dwell (time) factor refer to test report: 11238416S "Dwell time factor Calculation chart" sheet.

*Firmware and the module are the same as an original report

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	92.75	27.25	14.16	40.84	2.08	95.40	-	-	Carrier
Hori.	2399.662	PK	45.97	27.24	14.15	40.84	2.08	48.60	75.40	26.8	
Hori.	2400.000	PK	47.05	27.25	14.15	40.84	2.08	49.69	75.40	25.7	
Vert.	2402.000	PK	89.52	27.25	14.16	40.84	2.08	92.17	-	-	Carrier
Vert.	2399.631	PK	42.09	27.24	14.15	40.84	2.08	44.72	72.17	27.5	
Vert.	2400.000	PK	44.72	27.25	14.15	40.84	2.08	47.36	72.17	24.8	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.81\text{ m} / 3.0\text{ m}) = 2.08\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

UL Japan, Inc.

Shonan EMC Lab.

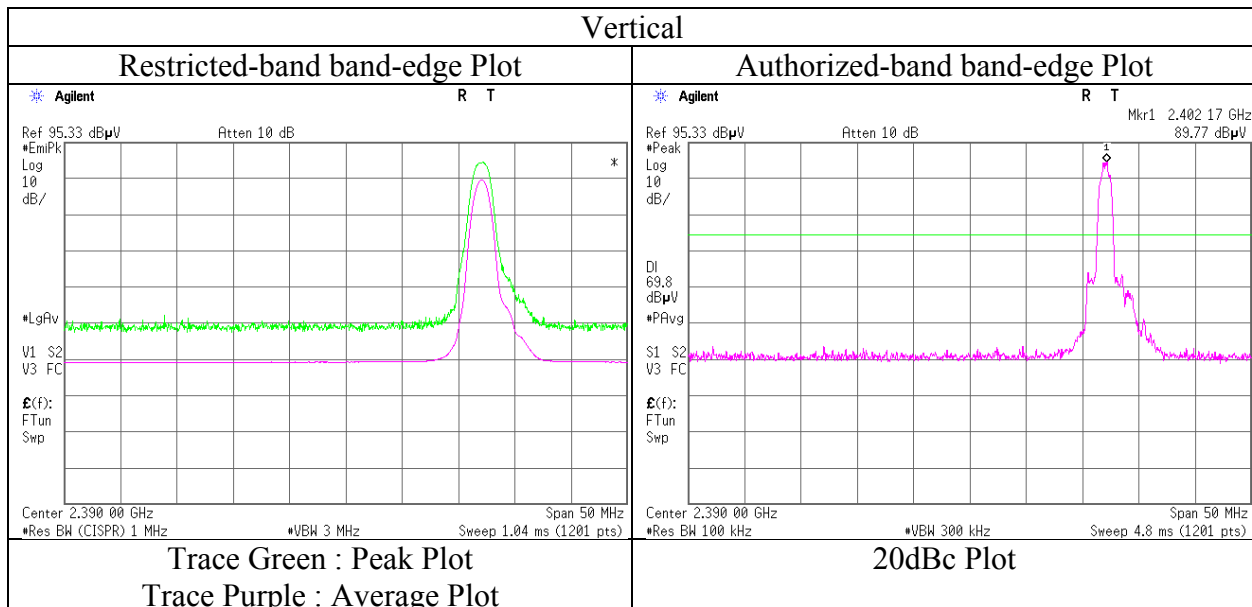
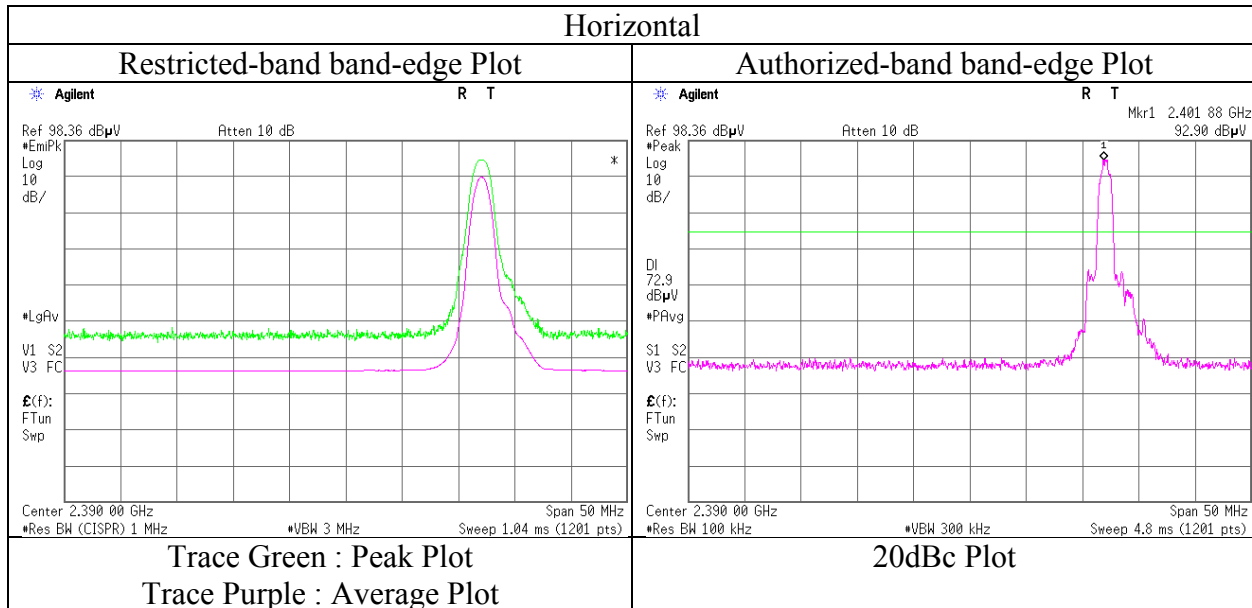
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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	11697713S-A-R2
Test place	Shonan EMC Lab. No.1 Semi Anechoic Chamber
Date	April 22, 2017 April 24, 2017
Temperature / Humidity	24 deg. C / 38 % RH 26 deg. C / 40 % RH
Engineer	Kazutaka Takeyama Hiroyuki Morikawa
	(1 GHz -26.5 GHz) (30 MHz- 1000 MHz)
Mode	Tx, Hopping Off, 3DH5 2402 MHz



* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Report No. 11697713S-A-R2
Test place Shonan EMC Lab. No.1 Semi Anechoic Chamber
Date April 22, 2017 April 24, 2017
Temperature / Humidity 24 deg. C / 38 % RH 26 deg. C / 40 % RH
Engineer Kazutaka Takeyama Hiroyuki Morikawa
(1 GHz -26.5 GHz) (30 MHz- 1000 MHz)
Mode Tx, Hopping Off, 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.	156.249	QP	44.94	15.16	8.91	31.77	0.00	37.24	43.50	6.2	226	116	
Hori.	161.999	QP	38.13	15.42	8.95	31.77	0.00	30.73	43.50	12.7	199	238	
Hori.	374.996	QP	29.84	15.20	7.42	31.77	0.00	20.69	46.00	25.3	101	261	
Hori.	437.504	QP	32.25	16.49	7.84	31.83	0.00	24.75	46.00	21.2	100	340	
Hori.	648.002	QP	34.51	19.43	8.83	32.02	0.00	30.75	46.00	15.2	100	175	
Hori.	864.354	QP	32.69	21.59	9.82	31.52	0.00	32.58	46.00	13.4	111	94	
Hori.	959.999	QP	28.81	22.38	10.19	30.84	0.00	30.54	46.00	15.4	149	149	
Hori.	1626.678	PK	49.32	25.19	13.49	41.05	2.08	49.03	73.90	24.8	151	83	
Hori.	4882.000	PK	49.71	31.29	6.72	41.76	2.08	48.04	73.90	25.8	177	212	
Hori.	7323.000	PK	46.81	36.41	8.20	41.27	2.08	52.23	73.90	21.6	100	0	
Hori.	9764.000	PK	45.22	38.36	9.09	40.62	2.08	54.13	73.90	19.7	100	0	
Hori.	1626.678	AV	40.78	25.19	13.49	41.05	2.08	40.49	53.90	13.4	151	83	
Vert.	133.405	QP	31.57	13.99	8.45	31.78	0.00	22.23	43.50	21.2	100	171	
Vert.	156.251	QP	39.55	15.16	8.91	31.77	0.00	31.85	43.50	11.6	100	207	
Vert.	161.998	QP	38.94	15.42	8.95	31.77	0.00	31.54	43.50	11.9	100	205	
Vert.	843.743	QP	28.70	21.33	9.72	31.62	0.00	28.13	46.00	17.8	100	314	
Vert.	864.355	QP	34.31	21.59	9.82	31.52	0.00	34.20	46.00	11.8	100	287	
Vert.	1626.642	PK	48.49	25.19	13.49	41.05	2.08	48.20	73.90	25.7	131	168	
Vert.	4882.000	PK	48.93	31.29	6.72	41.76	2.08	47.26	73.90	26.6	125	115	
Vert.	7323.000	PK	46.43	36.41	8.20	41.27	2.08	51.85	73.90	22.0	150	0	
Vert.	9764.000	PK	44.76	38.36	9.09	40.62	2.08	53.67	73.90	20.2	150	0	
Vert.	1626.642	AV	39.84	25.19	13.49	41.05	2.08	39.55	53.90	14.3	131	168	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.81\text{ m} / 3.0\text{ m}) = 2.08\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4882.000	AV	40.77	31.29	6.72	41.76	-24.63	2.08	14.47	53.90	39.4	
Hori.	7323.000	AV	35.42	36.41	8.20	41.27	-24.63	2.08	16.21	53.90	37.7	
Hori.	9764.000	AV	34.37	38.36	9.09	40.62	-24.63	2.08	18.65	53.90	35.2	
Vert.	4882.000	AV	36.15	31.29	6.72	41.76	-24.63	2.08	9.85	53.90	44.0	
Vert.	7323.000	AV	35.32	36.41	8.20	41.27	-24.63	2.08	16.11	53.90	37.8	
Vert.	9764.000	AV	34.23	38.36	9.09	40.62	-24.63	2.08	18.51	53.90	35.4	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.81\text{ m} / 3.0\text{ m}) = 2.08\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Dwell (time) factor refer to test report: 11238416S "Dwell time factor Calculation chart" sheet.

*Firmware and the module are the same as an original report

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Radiated Spurious Emission

Report No. 11697713S-A-R2
Test place Shonan EMC Lab. No.1 Semi Anechoic Chamber
Date April 22, 2017 April 24, 2017
Temperature / Humidity 24 deg. C / 38 % RH 26 deg. C / 40 % RH
Engineer Kazutaka Takeyama Hiroyuki Morikawa
(1 GHz -26.5 GHz) (30 MHz- 1000 MHz)
Mode Tx, Hopping Off, 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.	156.247	QP	45.51	15.16	8.91	31.77	0.00	37.81	43.50	5.6	216	124	
Hori.	162.004	QP	38.72	15.42	8.95	31.77	0.00	31.32	43.50	12.1	194	250	
Hori.	312.002	QP	29.96	13.78	6.88	31.76	0.00	18.86	46.00	27.1	100	167	
Hori.	480.048	QP	40.17	17.31	8.06	31.86	0.00	33.68	46.00	12.3	100	186	
Hori.	648.001	QP	31.58	19.43	8.83	32.02	0.00	27.82	46.00	18.1	103	294	
Hori.	843.746	QP	24.84	21.33	9.72	31.62	0.00	24.27	46.00	21.7	100	113	
Hori.	864.351	QP	32.72	21.59	9.82	31.52	0.00	32.61	46.00	13.3	109	95	
Hori.	959.641	QP	29.11	22.37	10.19	30.85	0.00	30.82	46.00	15.1	148	145	
Hori.	1652.739	PK	49.79	25.24	13.53	41.05	2.08	49.59	73.90	24.3	139	76	
Hori.	2483.500	PK	47.15	27.52	14.22	40.81	2.08	50.16	73.90	23.7	181	235	
Hori.	4960.000	PK	50.82	31.45	6.79	41.65	2.08	49.49	73.90	24.4	165	200	
Hori.	7440.000	PK	46.09	36.57	8.35	41.36	2.08	51.73	73.90	22.1	150	0	
Hori.	9920.000	PK	44.00	38.58	9.21	40.66	2.08	53.21	73.90	20.6	150	0	
Hori.	1652.739	AV	42.92	25.24	13.53	41.05	2.08	42.72	53.90	11.1	139	76	
Hori.	2483.500	AV	35.01	27.52	14.22	40.81	2.08	38.02	53.90	15.8	181	235	
Vert.	162.003	QP	39.02	15.42	8.95	31.77	0.00	31.62	43.50	11.8	100	201	
Vert.	843.751	QP	28.51	21.33	9.72	31.62	0.00	27.94	46.00	18.0	100	321	
Vert.	864.351	QP	34.20	21.59	9.82	31.52	0.00	34.09	46.00	11.9	100	280	
Vert.	1652.657	PK	48.50	25.24	13.53	41.05	2.08	48.30	73.90	25.6	118	162	
Vert.	2483.500	PK	47.40	27.52	14.22	40.81	2.08	50.41	73.90	23.4	112	351	
Vert.	4960.000	PK	48.91	31.45	6.79	41.65	2.08	47.58	73.90	26.3	164	166	
Vert.	7440.000	PK	46.21	36.57	8.35	41.36	2.08	51.85	73.90	22.0	150	0	
Vert.	9920.000	PK	44.71	38.58	9.21	40.66	2.08	53.92	73.90	19.9	150	0	
Vert.	1652.657	AV	40.64	25.24	13.53	41.05	2.08	40.44	53.90	13.4	118	162	
Vert.	2483.500	AV	34.94	27.52	14.22	40.81	2.08	37.95	53.90	15.9	112	351	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.81\text{ m} / 3.0\text{ m}) = 2.08\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4960.000	AV	40.03	31.45	6.79	41.65	-24.63	2.08	14.07	53.90	39.8	
Hori.	7440.000	AV	35.65	36.57	8.35	41.36	-24.63	2.08	16.66	53.90	37.2	
Hori.	9920.000	AV	34.11	38.58	9.21	40.66	-24.63	2.08	18.69	53.90	35.2	
Vert.	4960.000	AV	37.47	31.45	6.79	41.65	-24.63	2.08	11.51	53.90	42.4	
Vert.	7440.000	AV	35.51	36.57	8.35	41.36	-24.63	2.08	16.52	53.90	37.4	
Vert.	9920.000	AV	33.94	38.58	9.21	40.66	-24.63	2.08	18.52	53.90	35.4	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.81\text{ m} / 3.0\text{ m}) = 2.08\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Dwell (time) factor refer to test report: 11238416S "Dwell time factor Calculation chart" sheet.

*Firmware and the module are the same as an original report

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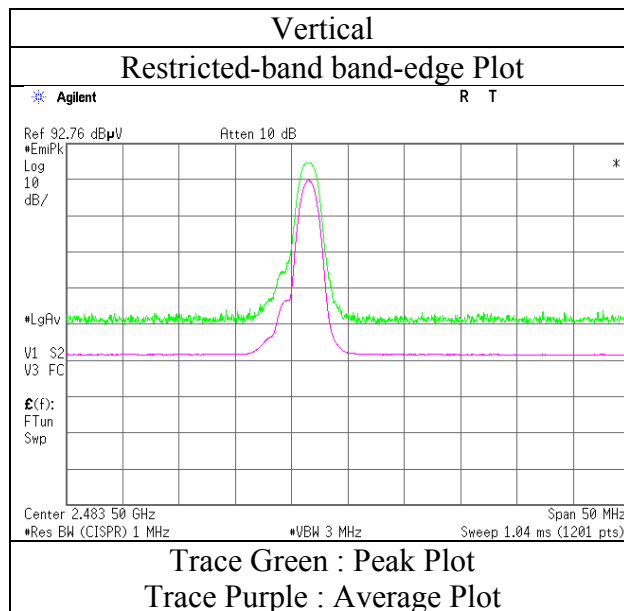
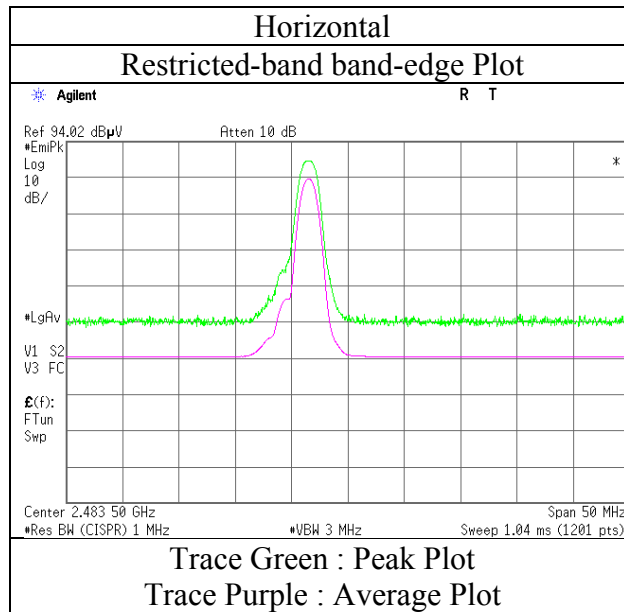
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Radiated Spurious Emission (Reference Plot for band-edge)

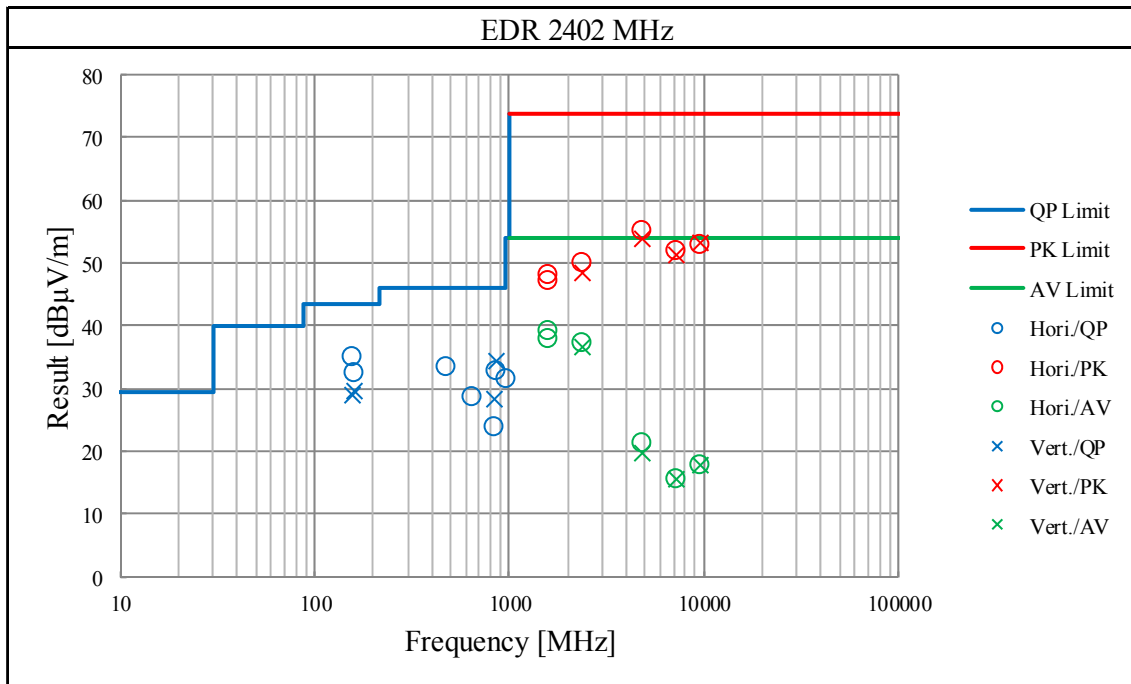
Report No.	11697713S-A-R2
Test place	Shonan EMC Lab. No.1 Semi Anechoic Chamber
Date	April 22, 2017 April 24, 2017
Temperature / Humidity	24 deg. C / 38 % RH 26 deg. C / 40 % RH
Engineer	Kazutaka Takeyama Hiroyuki Morikawa
	(1 GHz -26.5 GHz) (30 MHz- 1000 MHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz



* Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission (Plot data, Worst case)

Report No.	11697713S-A-R2
Test place	Shonan EMC Lab. No.1 Semi Anechoic Chamber
Date	April 22, 2017 April 24, 2017
Temperature / Humidity	24 deg. C / 38 % RH 26 deg. C / 40 % RH
Engineer	Kazutaka Takeyama Hiroyuki Morikawa (1 GHz -26.5 GHz) (30 MHz- 1000 MHz)
Mode	Tx, Hopping Off, 3DH5 2402 MHz



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

APPENDIX 2: Test instruments

Test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SAEC-01(NSA)	Semi-Anechoic Chamber	TDK	SAEC-01(NSA)	1	RE	2016/07/14 * 12
SAF-04	Pre Amplifier	TOYO Corporation	TPA0118-36	1440489	RE	2017/03/17 * 12
SCC-G05	Coaxial Cable	Junkosha	J12J102207-00	APR-30-15-037	RE	2017/01/08 * 12
SCC-G22	Coaxial Cable	Suhner	SUCOFLEX 104	296199/4	RE	2016/05/11 * 12
SHA-01	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-725	RE	2016/08/09 * 12
SOS-01	Humidity Indicator	A&D	AD-5681	4062555	RE	2016/10/12 * 12
SRENT-08	Spectrum Analyzer	Agilent	E4448A	MY50180019	RE	2016/10/24 * 12
KJM-09	Measure	KOMELON	KMC-36	-	RE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RFLMF)	-	RE	-
STS-01	Digital Hitester	Hioki	3805-50	080997812	RE	2016/10/17 * 12
SAF-09	Pre Amplifier	TOYO Corporation	HAP18-26W	00000018	RE	2016/09/27 * 12
SHA-05	Horn Antenna	ETS LINDGREN	3160-09	LM4210	RE	2017/03/15 * 12
SAF-10	Pre Amplifier	TOYO Corporation	HAP26-40W	00000010	RE	2017/03/17 * 12
SHA-06	Horn Antenna	ETS LINDGREN	3160-10	LM3459	RE	2017/03/15 * 12
SCC-G33	Coaxial Cable	Junkosha	MWX241-0100 0KMSKMS	-	RE	2016/04/18 * 12
SCC-G41	Coaxial Cable	Junkosha	MWX221-0100 0NFSNMS/B	1612S006	RE	2017/01/08 * 12
SCC-G19	Coaxial Cable	Suhner	SUCOFLEX 102A	1188/2A	RE	2017/03/23 * 12
SAF-01	Pre Amplifier	SONOMA	310N	290211	RE	2017/02/09 * 12
KAT6-04	Attenuator	INMET	18N-6dB	-	RE	2016/12/15 * 12
SAT3-09	Attenuator	JFW	50HF-003N	-	RE	2016/08/04 * 12
SBA-01	Biconical Antenna	Schwarzbeck	BBA9106	91032664	RE	2016/10/15 * 12
SCC-A1/A3/A5/A7/A8/A13/SRS E-01	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner /Suhner/Suhner/Suhner/T OYO	8D2W/12DSFA /141PE/141PE/ 141PE/141PE/ NS4906	-/0901-269(R F Selector)	RE	2017/04/07 * 12
SCC-A2/A4/A6/A7/A8/A13/SRS E-01	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner /Suhner/Suhner/Suhner/T OYO	8D2W/12DSFA /141PE/141PE/ 141PE/141PE/ NS4906	-/0901-269(R F Selector)	RE	2017/04/07 * 12
SLA-05	Logperiodic Antenna	Schwarzbeck	VUSLP9111B	193	RE	2017/01/05 * 12
STR-08	Test Receiver	Rohde & Schwarz	ESW44	101581	RE	2016/11/08 * 12
SAEC-01(SVSW R)	Semi-Anechoic Chamber	TDK	SAEC-01(SVSW R)	1	RE	2016/07/24 * 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

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