

Radiated Spurious Emission

Test place	Kashima EMC Lab.			
Semi Anechoic Chamber	No.10	No.10	No.10	No.10
Date	April 17, 2024	June 11, 2024	April 18, 2024	April 18, 2024
Temperature / Humidity	22 deg. C / 48 % RH	23 deg. C / 56 % RH	19 deg. C / 52 % RH	19 deg. C / 52 % RH
Engineer	Hiromitsu Tanabe	Kazuhiro Ando	Hiromitsu Tanabe	Hiromitsu Tanabe
	(1 GHz to 2.8 GHz)	(2.8 GHz to 10 GHz)	(10 GHz to 18 GHz)	(18 GHz to 26.5 GHz)
Mode	Tx 11b 2412 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.	2390.000	PK	58.61	27.60	13.01	43.66	3.29	58.85	73.9	15.0	224	59	-
Hori.	4824.000	PK	50.72	32.55	5.42	45.12	3.29	46.86	73.9	27.0	150	0	Floor noise
Hori.	6396.000	PK	51.25	35.30	6.17	45.06	3.29	50.95	73.9	22.9	224	188	-
Hori.	7236.000	PK	49.04	37.20	6.67	43.91	3.29	52.29	73.9	21.6	150	0	Floor noise
Hori.	9648.000	PK	47.87	37.94	7.48	41.89	3.29	54.69	73.9	19.2	150	0	Floor noise
Hori.	10000.000	PK	52.56	38.18	7.63	41.86	-9.54	46.97	73.9	26.9	144	28	-
Hori.	2390.000	AV	46.90	27.60	13.01	43.66	3.29	47.14	53.9	6.7	224	59	-
Hori.	4824.000	AV	41.48	32.55	5.42	45.12	3.29	37.62	53.9	16.2	150	0	Floor noise
Hori.	6396.000	AV	42.56	35.30	6.17	45.06	3.29	42.26	53.9	11.6	224	188	-
Hori.	7236.000	AV	39.53	37.20	6.67	43.91	3.29	42.78	53.9	11.1	150	0	Floor noise
Hori.	9648.000	AV	37.88	37.94	7.48	41.89	3.29	44.70	53.9	9.2	150	0	Floor noise
Hori.	10000.000	AV	45.36	38.18	7.63	41.86	-9.54	39.77	53.9	14.1	144	28	-
Vert.	2390.000	PK	59.76	27.60	13.01	43.66	3.29	60.00	73.9	13.9	326	324	-
Vert.	4824.000	PK	50.51	32.55	5.42	45.12	3.29	46.65	73.9	27.2	150	0	Floor noise
Vert.	6396.000	PK	52.94	35.30	6.17	45.06	3.29	52.64	73.9	21.2	161	202	-
Vert.	7236.000	PK	48.94	37.20	6.67	43.91	3.29	52.19	73.9	21.7	150	0	Floor noise
Vert.	9648.000	PK	48.58	37.94	7.48	41.89	3.29	55.40	73.9	18.5	150	0	Floor noise
Vert.	10000.000	PK	53.79	38.18	7.63	41.86	-9.54	48.20	73.9	25.7	220	16	-
Vert.	2390.000	AV	40.34	27.60	13.01	43.66	3.29	40.58	53.9	13.3	326	324	-
Vert.	4824.000	AV	41.50	32.55	5.42	45.12	3.29	37.64	53.9	16.2	150	0	Floor noise
Vert.	6396.000	AV	44.19	35.30	6.17	45.06	3.29	43.89	53.9	10.0	161	202	-
Vert.	7236.000	AV	39.68	37.20	6.67	43.91	3.29	42.93	53.9	10.9	150	0	Floor noise
Vert.	9648.000	AV	38.29	37.94	7.48	41.89	3.29	45.11	53.9	8.7	150	0	Floor noise
Vert.	10000.000	AV	48.19	38.18	7.63	41.86	-9.54	42.60	53.9	11.3	220	16	-

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

Distance factor : 1 GHz - 10 GHz : 20log (4.38 m / 3.0 m) = 3.29 dB

10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 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.	2412.000	PK	91.77	27.62	13.02	43.65	3.29	92.05	-	-	Carrier
Hori.	2400.000	PK	61.81	27.60	13.02	43.65	3.29	62.07	72.1	9.9	-
Vert.	2412.000	PK	93.25	27.62	13.02	43.65	3.29	93.53	-	-	Carrier
Vert.	2400.000	PK	61.95	27.60	13.02	43.65	3.29	62.21	73.6	11.3	-

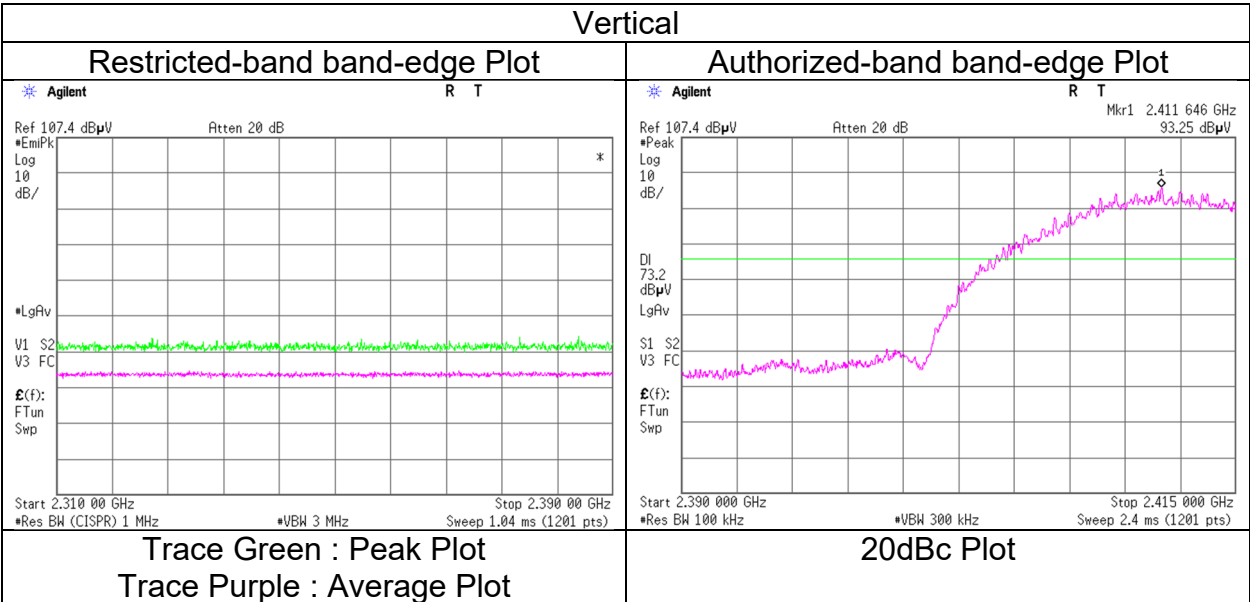
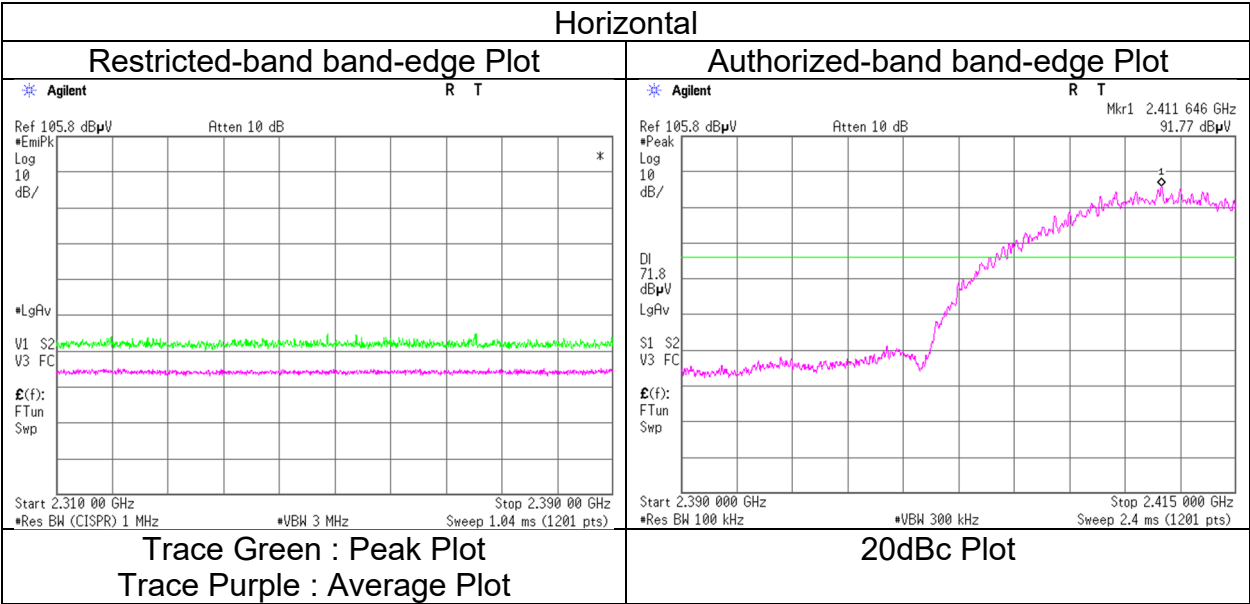
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : 20log (4.38 m / 3.0 m) = 3.29 dB

10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place Kashima EMC Lab.
Semi Anechoic Chamber No.10
Date April 17, 2024
Temperature / Humidity 22 deg. C / 48 % RH
Engineer Hiromitsu Tanabe
 (1 GHz to 2.8 GHz)
Mode Tx 11b 2412 MHz



* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge and authorized band edge were shown in tabular data.

Radiated Spurious Emission

Test place	Kashima EMC Lab.			
Semi Anechoic Chamber	No.10	No.10	No.10	No.10
Date	April 17, 2024	June 11, 2024	April 18, 2024	April 18, 2024
Temperature / Humidity	22 deg. C / 48 % RH	23 deg. C / 56 % RH	19 deg. C / 52 % RH	19 deg. C / 52 % RH
Engineer	Hiromitsu Tanabe	Kazuhiro Ando	Hiromitsu Tanabe	Hiromitsu Tanabe
	(1 GHz to 2.8 GHz)	(2.8 GHz to 10 GHz)	(10 GHz to 18 GHz)	(18 GHz to 26.5 GHz)
Mode	Tx 11b 2437 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.	4874.000	PK	50.93	32.56	5.46	45.15	3.29	47.09	73.9	26.8	150	0	Floor noise
Hori.	6396.000	PK	51.30	35.30	6.17	45.06	3.29	51.00	73.9	22.9	171	265	-
Hori.	7311.000	PK	48.60	37.37	6.69	43.73	3.29	52.22	73.9	21.6	150	0	Floor noise
Hori.	9748.000	PK	47.22	37.90	7.51	41.77	3.29	54.15	73.9	19.7	150	0	Floor noise
Hori.	10000.000	PK	51.90	38.18	7.63	41.86	-9.54	46.31	73.9	27.5	152	29	-
Hori.	4874.000	AV	40.23	32.56	5.46	45.15	3.29	36.39	53.9	17.5	150	0	Floor noise
Hori.	6396.000	AV	42.98	35.30	6.17	45.06	3.29	42.68	53.9	11.2	171	265	-
Hori.	7311.000	AV	39.48	37.37	6.69	43.73	3.29	43.10	53.9	10.8	150	0	Floor noise
Hori.	9748.000	AV	37.44	37.90	7.51	41.77	3.29	44.37	53.9	9.5	150	0	Floor noise
Hori.	10000.000	AV	44.57	38.18	7.63	41.86	-9.54	38.98	53.9	14.9	152	29	-
Vert.	4874.000	PK	50.91	32.56	5.46	45.15	3.29	47.07	73.9	26.8	150	0	Floor noise
Vert.	6396.000	PK	52.10	35.30	6.17	45.06	3.29	51.80	73.9	22.1	163	203	-
Vert.	7311.000	PK	48.23	37.37	6.69	43.73	3.29	51.85	73.9	22.0	150	0	Floor noise
Vert.	9748.000	PK	47.14	37.90	7.51	41.77	3.29	54.07	73.9	19.8	150	0	Floor noise
Vert.	10000.000	PK	53.92	38.18	7.63	41.86	-9.54	48.33	73.9	25.5	178	10	-
Vert.	4874.000	AV	40.31	32.56	5.46	45.15	3.29	36.47	53.9	17.4	150	0	Floor noise
Vert.	6396.000	AV	43.14	35.30	6.17	45.06	3.29	42.84	53.9	11.0	163	203	-
Vert.	7311.000	AV	39.36	37.37	6.69	43.73	3.29	42.98	53.9	10.9	150	0	Floor noise
Vert.	9748.000	AV	37.34	37.90	7.51	41.77	3.29	44.27	53.9	9.6	150	0	Floor noise
Vert.	10000.000	AV	48.07	38.18	7.63	41.86	-9.54	42.48	53.9	11.4	178	10	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor
Distance factor : 1 GHz - 10 GHz : 20log (4.38 m / 3.0 m) = 3.29 dB
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission

Test place	Kashima EMC Lab.			
Semi Anechoic Chamber	No.10	No.10	No.10	No.10
Date	April 17, 2024	June 11, 2024	April 18, 2024	April 18, 2024
Temperature / Humidity	22 deg. C / 48 % RH	23 deg. C / 56 % RH	19 deg. C / 52 % RH	19 deg. C / 52 % RH
Engineer	Hiromitsu Tanabe	Kazuhiro Ando	Hiromitsu Tanabe	Hiromitsu Tanabe
	(1 GHz to 2.8 GHz)	(2.8 GHz to 10 GHz)	(10 GHz to 18 GHz)	(18 GHz to 26.5 GHz)
Mode	Tx 11b 2462 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.	2483.500	PK	53.82	27.86	13.07	43.62	3.29	54.42	73.9	19.4	156	61	-
Hori.	4924.000	PK	50.44	32.58	5.48	45.18	3.29	46.61	73.9	27.2	150	0	Floor noise
Hori.	6396.000	PK	51.83	35.30	6.17	45.06	3.29	51.53	73.9	22.3	169	263	-
Hori.	7386.000	PK	48.61	37.42	6.71	43.56	3.29	52.47	73.9	21.4	150	0	Floor noise
Hori.	9848.000	PK	47.12	38.02	7.55	41.70	3.29	54.28	73.9	19.6	150	0	Floor noise
Hori.	10000.000	PK	51.65	38.18	7.63	41.86	-9.54	46.06	73.9	27.8	258	29	-
Hori.	2483.500	AV	40.58	27.86	13.07	43.62	3.29	41.18	53.9	12.7	156	61	-
Hori.	4924.000	AV	41.41	32.58	5.48	45.18	3.29	37.58	53.9	16.3	150	0	Floor noise
Hori.	6396.000	AV	43.03	35.30	6.17	45.06	3.29	42.73	53.9	11.1	169	263	-
Hori.	7386.000	AV	39.63	37.42	6.71	43.56	3.29	43.49	53.9	10.4	150	0	Floor noise
Hori.	9848.000	AV	38.17	38.02	7.55	41.70	3.29	45.33	53.9	8.5	150	0	Floor noise
Hori.	10000.000	AV	42.25	38.18	7.63	41.86	-9.54	36.66	53.9	17.2	258	29	-
Vert.	2483.500	PK	54.93	27.86	13.07	43.62	3.29	55.53	73.9	18.3	287	350	-
Vert.	4924.000	PK	50.92	32.58	5.48	45.18	3.29	47.09	73.9	26.8	150	0	Floor noise
Vert.	6396.000	PK	52.31	35.30	6.17	45.06	3.29	52.01	73.9	21.8	155	201	-
Vert.	7386.000	PK	48.53	37.42	6.71	43.56	3.29	52.39	73.9	21.5	150	0	Floor noise
Vert.	9848.000	PK	47.00	38.02	7.55	41.70	3.29	54.16	73.9	19.7	150	0	Floor noise
Vert.	10000.000	PK	52.95	38.18	7.63	41.86	-9.54	47.36	73.9	26.5	150	39	-
Vert.	2483.500	AV	40.77	27.86	13.07	43.62	3.29	41.37	53.9	12.5	287	350	-
Vert.	4924.000	AV	41.47	32.58	5.48	45.18	3.29	37.64	53.9	16.2	150	0	Floor noise
Vert.	6396.000	AV	43.72	35.30	6.17	45.06	3.29	43.42	53.9	10.4	155	201	-
Vert.	7386.000	AV	39.72	37.42	6.71	43.56	3.29	43.58	53.9	10.3	150	0	Floor noise
Vert.	9848.000	AV	38.18	38.02	7.55	41.70	3.29	45.34	53.9	8.5	150	0	Floor noise
Vert.	10000.000	AV	46.43	38.18	7.63	41.86	-9.54	40.84	53.9	13.0	150	39	-

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

Distance factor : 1 GHz - 10 GHz : 20log (4.38 m / 3.0 m) = 3.29 dB

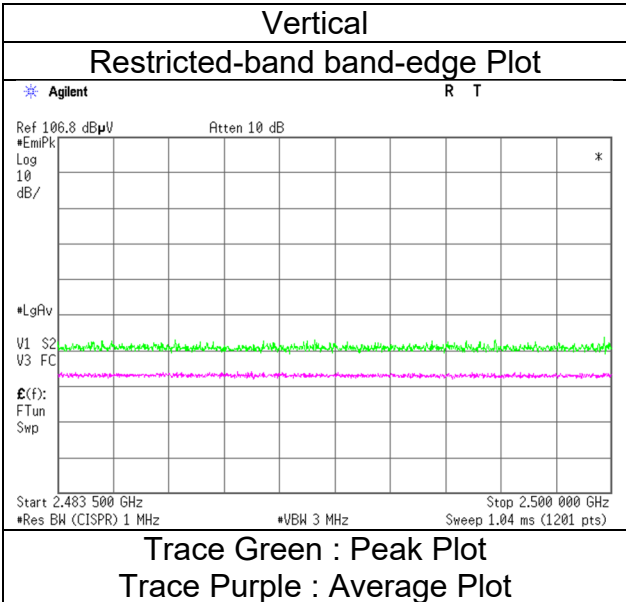
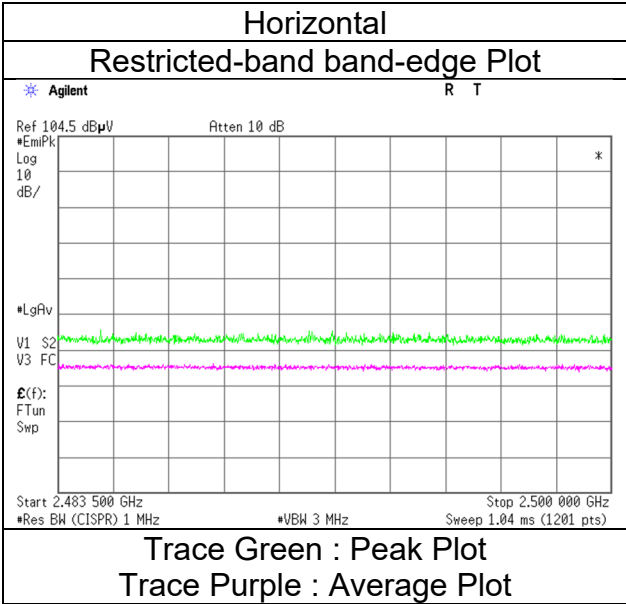
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer

Mode

Kashima EMC Lab.
No.10
April 17, 2024
22 deg. C / 48 % RH
Hiromitsu Tanabe
(1 GHz to 2.8 GHz)
Tx 11b 2462 MHz



* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Test place	Kashima EMC Lab.			
Semi Anechoic Chamber	No.10	No.10	No.10	No.10
Date	April 17, 2024	June 11, 2024	April 18, 2024	April 18, 2024
Temperature / Humidity	22 deg. C / 48 % RH	23 deg. C / 56 % RH	19 deg. C / 52 % RH	19 deg. C / 52 % RH
Engineer	Hiromitsu Tanabe	Kazuhiro Ando	Hiromitsu Tanabe	Hiromitsu Tanabe
	(1 GHz to 2.8 GHz)	(2.8 GHz to 10 GHz)	(10 GHz to 18 GHz)	(18 GHz to 26.5 GHz)
Mode	Tx 11g 2412 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.	2390.000	PK	57.30	27.60	13.01	43.66	3.29	57.54	73.9	16.3	224	59	-
Hori.	4824.000	PK	50.55	32.55	5.42	45.12	3.29	46.69	73.9	27.2	150	0	Floor noise
Hori.	6396.000	PK	51.44	35.30	6.17	45.06	3.29	51.14	73.9	22.7	169	276	-
Hori.	7236.000	PK	49.09	37.20	6.67	43.91	3.29	52.34	73.9	21.5	150	0	Floor noise
Hori.	9648.000	PK	47.16	37.94	7.48	41.89	3.29	53.98	73.9	19.9	150	0	Floor noise
Hori.	10000.000	PK	51.75	38.18	7.63	41.86	-9.54	46.16	73.9	27.7	145	28	-
Hori.	4824.000	AV	41.53	32.55	5.42	45.12	3.29	37.67	53.9	16.2	150	0	Floor noise
Hori.	6396.000	AV	42.80	35.30	6.17	45.06	3.29	42.50	53.9	11.4	169	276	-
Hori.	7236.000	AV	39.41	37.20	6.67	43.91	3.29	42.66	53.9	11.2	150	0	Floor noise
Hori.	9648.000	AV	37.68	37.94	7.48	41.89	3.29	44.50	53.9	9.4	150	0	Floor noise
Hori.	10000.000	AV	44.88	38.18	7.63	41.86	-9.54	39.29	53.9	14.6	145	28	-
Vert.	2390.000	PK	57.76	27.60	13.01	43.66	3.29	58.00	73.9	15.9	325	329	-
Vert.	4824.000	PK	50.17	32.55	5.42	45.12	3.29	46.31	73.9	27.5	150	0	Floor noise
Vert.	6396.000	PK	51.72	35.30	6.17	45.06	3.29	51.42	73.9	22.4	154	201	-
Vert.	7236.000	PK	49.04	37.20	6.67	43.91	3.29	52.29	73.9	21.6	150	0	Floor noise
Vert.	9648.000	PK	47.35	37.94	7.48	41.89	3.29	54.17	73.9	19.7	150	0	Floor noise
Vert.	10000.000	PK	54.06	38.18	7.63	41.86	-9.54	48.47	73.9	25.4	221	12	-
Vert.	4824.000	AV	41.47	32.55	5.42	45.12	3.29	37.61	53.9	16.2	150	0	Floor noise
Vert.	6396.000	AV	43.69	35.30	6.17	45.06	3.29	43.39	53.9	10.5	154	201	-
Vert.	7236.000	AV	39.54	37.20	6.67	43.91	3.29	42.79	53.9	11.1	150	0	Floor noise
Vert.	9648.000	AV	37.91	37.94	7.48	41.89	3.29	44.73	53.9	9.1	150	0	Floor noise
Vert.	10000.000	AV	48.69	38.18	7.63	41.86	-9.54	43.10	53.9	10.8	221	12	-

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

Distance factor : 1 GHz - 10 GHz : 20log (4.38 m / 3.0 m) = 3.29 dB

10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2390.000	AV	44.89	27.60	13.01	43.66	0.38	3.29	45.51	53.9	8.3	-
Vert.	2390.000	AV	45.97	27.60	13.01	43.66	0.38	3.29	46.59	53.9	7.3	-

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

Distance factor : 1 GHz - 10 GHz : 20log (4.38 m / 3.0 m) = 3.29 dB

10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Duty factor refer to "Burst rate confirmation" sheet.

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.	2412.000	PK	85.45	27.62	13.02	43.65	3.29	85.73	-	-	Carrier
Hori.	2400.000	PK	54.05	27.60	13.02	43.65	3.29	54.31	65.73	11.4	-
Vert.	2412.000	PK	87.20	27.62	13.02	43.65	3.29	87.48	-	-	Carrier
Vert.	2400.000	PK	55.33	27.60	13.02	43.65	3.29	55.59	67.48	11.8	-

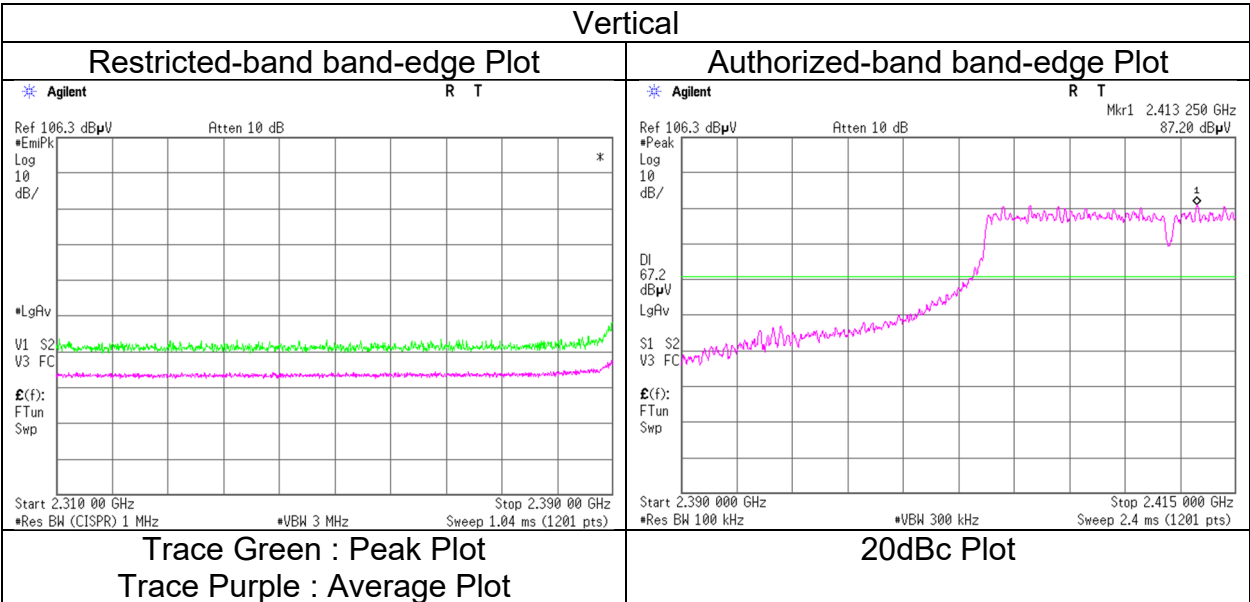
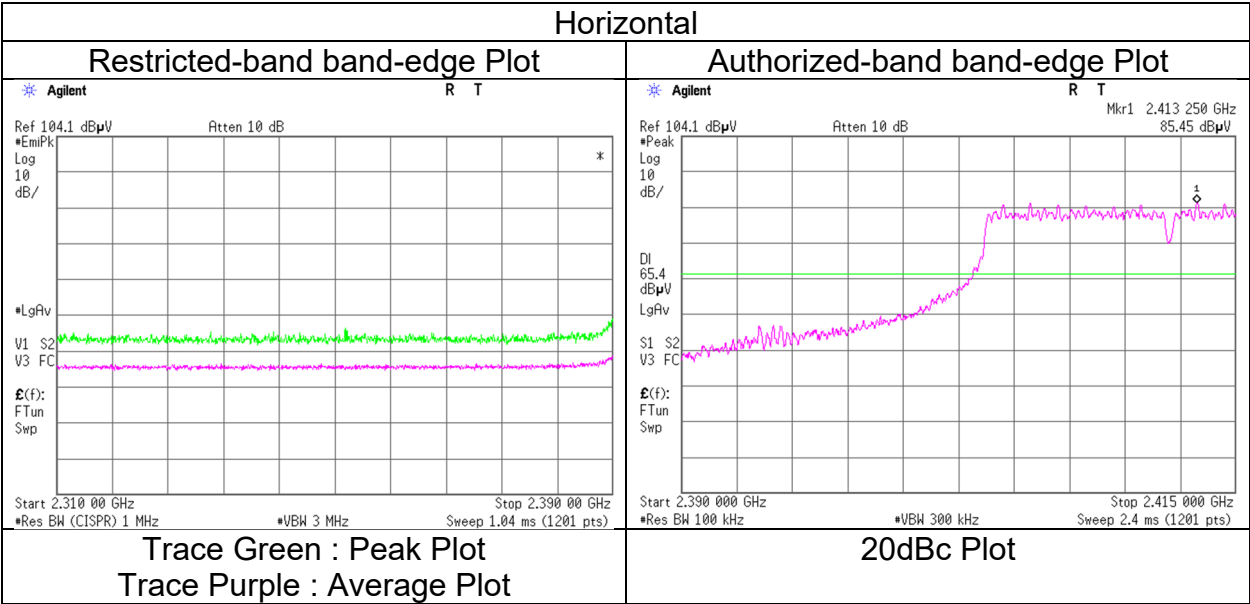
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : 20log (4.38 m / 3.0 m) = 3.29 dB

10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

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(Reference Plot for band-edge)

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Semi Anechoic Chamber No.10
Date April 17, 2024
Temperature / Humidity 22 deg. C / 48 % RH
Engineer Hiromitsu Tanabe
 (1 GHz to 2.8 GHz)
Mode Tx 11g 2412 MHz



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Date	April 17, 2024	June 11, 2024	April 18, 2024	April 18, 2024
Temperature / Humidity	22 deg. C / 48 % RH	23 deg. C / 56 % RH	19 deg. C / 52 % RH	19 deg. C / 52 % RH
Engineer	Hiromitsu Tanabe	Kazuhiro Ando	Hiromitsu Tanabe	Hiromitsu Tanabe
	(1 GHz to 2.8 GHz)	(2.8 GHz to 10 GHz)	(10 GHz to 18 GHz)	(18 GHz to 26.5 GHz)
Mode	Tx 11g 2437 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.	4874.000	PK	50.31	32.56	5.46	45.15	3.29	46.47	73.9	27.4	150	0	Floor noise
Hori.	6396.000	PK	51.24	35.30	6.17	45.06	3.29	50.94	73.9	22.9	171	259	-
Hori.	7311.000	PK	48.85	37.37	6.69	43.73	3.29	52.47	73.9	21.4	150	0	Floor noise
Hori.	9748.000	PK	46.24	37.90	7.51	41.77	3.29	53.17	73.9	20.7	150	0	Floor noise
Hori.	10000.000	PK	52.31	38.18	7.63	41.86	-9.54	46.72	73.9	27.1	144	28	-
Hori.	4874.000	AV	40.99	32.56	5.46	45.15	3.29	37.15	53.9	16.7	150	0	Floor noise
Hori.	6396.000	AV	43.10	35.30	6.17	45.06	3.29	42.80	53.9	11.1	171	259	-
Hori.	7311.000	AV	39.43	37.37	6.69	43.73	3.29	43.05	53.9	10.8	150	0	Floor noise
Hori.	9748.000	AV	37.48	37.90	7.51	41.77	3.29	44.41	53.9	9.4	150	0	Floor noise
Hori.	10000.000	AV	45.12	38.18	7.63	41.86	-9.54	39.53	53.9	14.3	144	28	-
Vert.	4874.000	PK	50.59	32.56	5.46	45.15	3.29	46.75	73.9	27.1	150	0	Floor noise
Vert.	6396.000	PK	51.68	35.30	6.17	45.06	3.29	51.38	73.9	22.5	177	202	-
Vert.	7311.000	PK	48.20	37.37	6.69	43.73	3.29	51.82	73.9	22.0	150	0	Floor noise
Vert.	9748.000	PK	46.46	37.90	7.51	41.77	3.29	53.39	73.9	20.5	150	0	Floor noise
Vert.	10000.000	PK	54.70	38.18	7.63	41.86	-9.54	49.11	73.9	24.7	207	15	-
Vert.	4874.000	AV	41.27	32.56	5.46	45.15	3.29	37.43	53.9	16.4	150	0	Floor noise
Vert.	6396.000	AV	43.39	35.30	6.17	45.06	3.29	43.09	53.9	10.8	177	202	-
Vert.	7311.000	AV	39.58	37.37	6.69	43.73	3.29	43.20	53.9	10.7	150	0	Floor noise
Vert.	9748.000	AV	37.21	37.90	7.51	41.77	3.29	44.14	53.9	9.7	150	0	Floor noise
Vert.	10000.000	AV	48.59	38.18	7.63	41.86	-9.54	43.00	53.9	10.9	207	15	-

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

Distance factor : 1 GHz - 10 GHz : 20log (4.38 m / 3.0 m) = 3.29 dB

10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission

Test place Kashima EMC Lab.
Semi Anechoic Chamber No.10 No.10 No.10 No.10
Date April 17, 2024 June 11, 2024 April 18, 2024 April 18, 2024
Temperature / Humidity 22 deg. C / 48 % RH 23 deg. C / 56 % RH 19 deg. C / 52 % RH 19 deg. C / 52 % RH
Engineer Hiromitsu Tanabe Kazuhiro Ando Hiromitsu Tanabe Hiromitsu Tanabe
 (1 GHz to 2.8 GHz) (2.8 GHz to 10 GHz) (10 GHz to 18 GHz) (18 GHz to 26.5 GHz)
Mode Tx 11g 2462 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.	2483.500	PK	56.83	27.86	13.07	43.62	3.29	57.43	73.9	16.4	244	51	-
Hori.	4924.000	PK	50.84	32.58	5.48	45.18	3.29	47.01	73.9	26.8	150	0	Floor noise
Hori.	6396.000	PK	52.18	35.30	6.17	45.06	3.29	51.88	73.9	22.0	175	262	-
Hori.	7386.000	PK	48.48	37.42	6.71	43.56	3.29	52.34	73.9	21.5	150	0	Floor noise
Hori.	9848.000	PK	46.86	38.02	7.55	41.70	3.29	54.02	73.9	19.8	150	0	Floor noise
Hori.	10000.000	PK	51.96	38.18	7.63	41.86	-9.54	46.37	73.9	27.5	145	28	-
Hori.	4924.000	AV	41.27	32.58	5.48	45.18	3.29	37.44	53.9	16.4	150	0	Floor noise
Hori.	6396.000	AV	43.54	35.30	6.17	45.06	3.29	43.24	53.9	10.6	175	262	-
Hori.	7386.000	AV	39.71	37.42	6.71	43.56	3.29	43.57	53.9	10.3	150	0	Floor noise
Hori.	9848.000	AV	38.15	38.02	7.55	41.70	3.29	45.31	53.9	8.5	150	0	Floor noise
Hori.	10000.000	AV	44.64	38.18	7.63	41.86	-9.54	39.05	53.9	14.8	145	28	-
Vert.	2483.500	PK	58.96	27.86	13.07	43.62	3.29	59.56	73.9	14.3	287	346	-
Vert.	4924.000	PK	50.57	32.58	5.48	45.18	3.29	46.74	73.9	27.1	150	0	Floor noise
Vert.	6396.000	PK	52.71	35.30	6.17	45.06	3.29	52.41	73.9	21.4	158	201	-
Vert.	7386.000	PK	48.82	37.42	6.71	43.56	3.29	52.68	73.9	21.2	150	0	Floor noise
Vert.	9848.000	PK	47.26	38.02	7.55	41.70	3.29	54.42	73.9	19.4	150	0	Floor noise
Vert.	10000.000	PK	54.11	38.18	7.63	41.86	-9.54	48.52	73.9	25.3	202	40	-
Vert.	4924.000	AV	41.98	32.58	5.48	45.18	3.29	38.15	53.9	15.7	150	0	Floor noise
Vert.	6396.000	AV	43.62	35.30	6.17	45.06	3.29	43.32	53.9	10.5	158	201	-
Vert.	7386.000	AV	39.85	37.42	6.71	43.56	3.29	43.71	53.9	10.1	150	0	Floor noise
Vert.	9848.000	AV	37.88	38.02	7.55	41.70	3.29	45.04	53.9	8.8	150	0	Floor noise
Vert.	10000.000	AV	48.22	38.18	7.63	41.86	-9.54	42.63	53.9	11.2	202	40	-

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

Distance factor : 1 GHz - 10 GHz : 20log (4.38 m / 3.0 m) = 3.29 dB

10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	45.03	27.86	13.07	43.62	0.38	3.29	46.01	53.9	7.8	-
Vert.	2483.500	AV	47.16	27.86	13.07	43.62	0.38	3.29	48.14	53.9	5.7	-

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

Distance factor : 1 GHz - 10 GHz : 20log (4.38 m / 3.0 m) = 3.29 dB

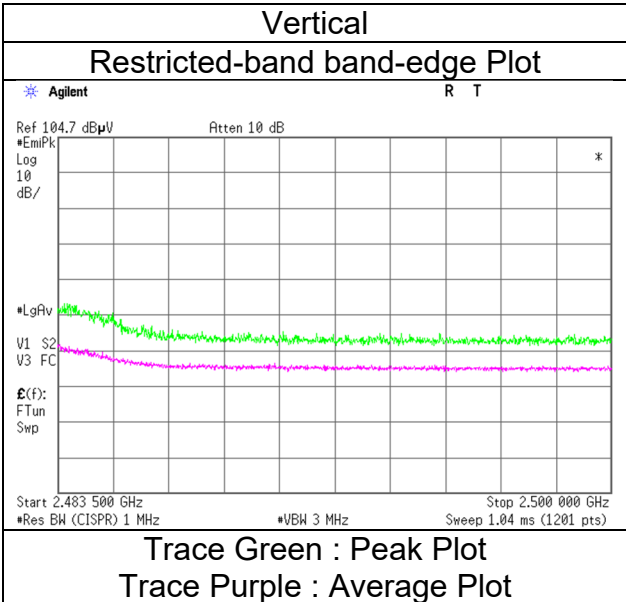
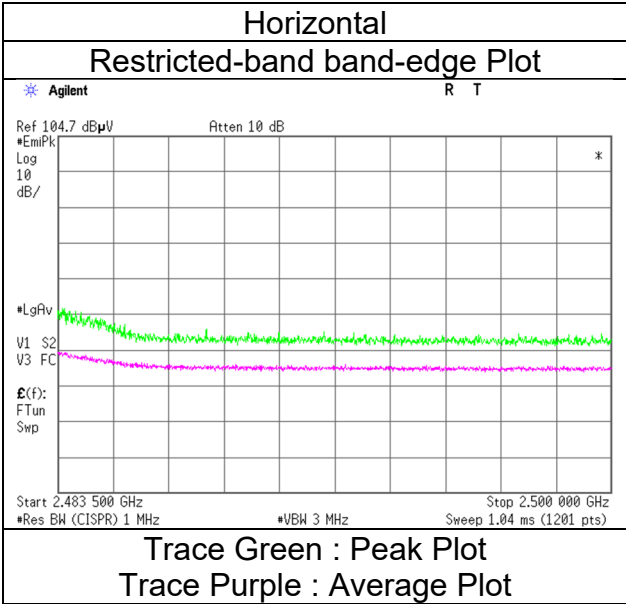
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Duty factor refer to "Burst rate confirmation" sheet.

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer
Mode

Kashima EMC Lab.
No.10
April 17, 2024
22 deg. C / 48 % RH
Hiromitsu Tanabe
(1 GHz to 2.8 GHz)
Tx 11g 2462 MHz



* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Test place Kashima EMC Lab.
Semi Anechoic Chamber No.10 No.10 No.10 No.10
Date April 17, 2024 June 11, 2024 April 18, 2024 April 18, 2024
Temperature / Humidity 22 deg. C / 48 % RH 23 deg. C / 56 % RH 19 deg. C / 52 % RH 19 deg. C / 52 % RH
Engineer Hiromitsu Tanabe Kazuhiro Ando Hiromitsu Tanabe Hiromitsu Tanabe
 (1 GHz to 2.8 GHz) (2.8 GHz to 10 GHz) (10 GHz to 18 GHz) (18 GHz to 26.5 GHz)
Mode Tx 11n-20 2412 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.	2390.000	PK	57.06	27.60	13.01	43.66	3.29	57.30	73.9	16.6	222	61	-
Hori.	4824.000	PK	51.19	32.55	5.42	45.12	3.29	47.33	73.9	26.5	150	0	Floor noise
Hori.	6396.000	PK	51.85	35.30	6.17	45.06	3.29	51.55	73.9	22.3	109	271	-
Hori.	7236.000	PK	48.45	37.20	6.67	43.91	3.29	51.70	73.9	22.2	150	0	Floor noise
Hori.	9648.000	PK	47.11	37.94	7.48	41.89	3.29	53.93	73.9	19.9	150	0	Floor noise
Hori.	10000.000	PK	51.02	38.18	7.63	41.86	-9.54	45.43	73.9	28.4	223	28	-
Hori.	4824.000	AV	41.75	32.55	5.42	45.12	3.29	37.89	53.9	16.0	150	0	Floor noise
Hori.	6396.000	AV	43.39	35.30	6.17	45.06	3.29	43.09	53.9	10.8	109	271	-
Hori.	7236.000	AV	39.52	37.20	6.67	43.91	3.29	42.77	53.9	11.1	150	0	Floor noise
Hori.	9648.000	AV	38.19	37.94	7.48	41.89	3.29	45.01	53.9	8.8	150	0	Floor noise
Hori.	10000.000	AV	42.63	38.18	7.63	41.86	-9.54	37.04	53.9	16.8	223	28	-
Vert.	2390.000	PK	57.21	27.60	13.01	43.66	3.29	57.45	73.9	16.4	324	325	-
Vert.	4824.000	PK	50.48	32.55	5.42	45.12	3.29	46.62	73.9	27.2	150	0	Floor noise
Vert.	6396.000	PK	52.54	35.30	6.17	45.06	3.29	52.24	73.9	21.6	179	202	-
Vert.	7236.000	PK	49.40	37.20	6.67	43.91	3.29	52.65	73.9	21.2	150	0	Floor noise
Vert.	9648.000	PK	47.19	37.94	7.48	41.89	3.29	54.01	73.9	19.8	150	0	Floor noise
Vert.	10000.000	PK	53.53	38.18	7.63	41.86	-9.54	47.94	73.9	25.9	202	40	-
Vert.	4824.000	AV	41.79	32.55	5.42	45.12	3.29	37.93	53.9	15.9	150	0	Floor noise
Vert.	6396.000	AV	43.97	35.30	6.17	45.06	3.29	43.67	53.9	10.2	179	202	-
Vert.	7236.000	AV	39.50	37.20	6.67	43.91	3.29	42.75	53.9	11.1	150	0	Floor noise
Vert.	9648.000	AV	37.98	37.94	7.48	41.89	3.29	44.80	53.9	9.1	150	0	Floor noise
Vert.	10000.000	AV	47.07	38.18	7.63	41.86	-9.54	41.48	53.9	12.4	202	40	-

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

Distance factor : 1 GHz - 10 GHz : 20log (4.38 m / 3.0 m) = 3.29 dB

10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2390.000	AV	45.03	27.60	13.01	43.66	0.57	3.29	45.84	53.9	8.0	-
Vert.	2390.000	AV	45.53	27.60	13.01	43.66	0.57	3.29	46.34	53.9	7.5	-

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

Distance factor : 1 GHz - 10 GHz : 20log (4.38 m / 3.0 m) = 3.29 dB

10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Duty factor refer to "Burst rate confirmation" sheet.

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.	2412.000	PK	85.07	27.62	13.02	43.65	3.29	85.35	-	-	Carrier
Hori.	2400.000	PK	55.07	27.60	13.02	43.65	3.29	55.33	65.4	10.0	-
Vert.	2412.000	PK	87.01	27.62	13.02	43.65	3.29	87.29	-	-	carrier
Vert.	2400.000	PK	55.68	27.60	13.02	43.65	3.29	55.94	67.3	11.3	-

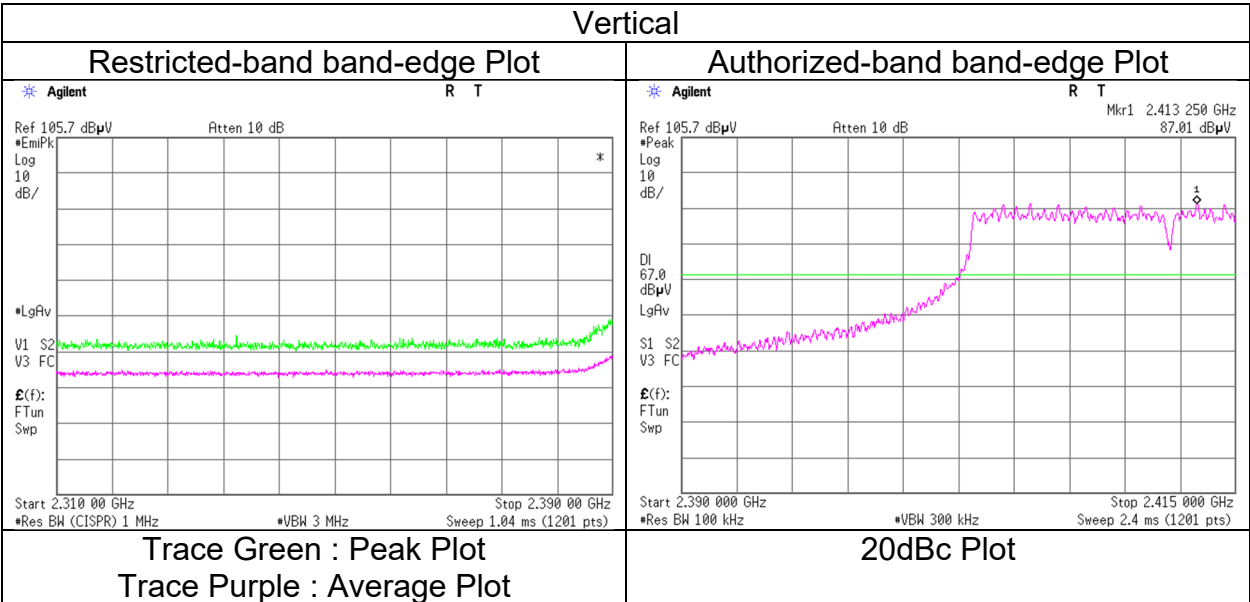
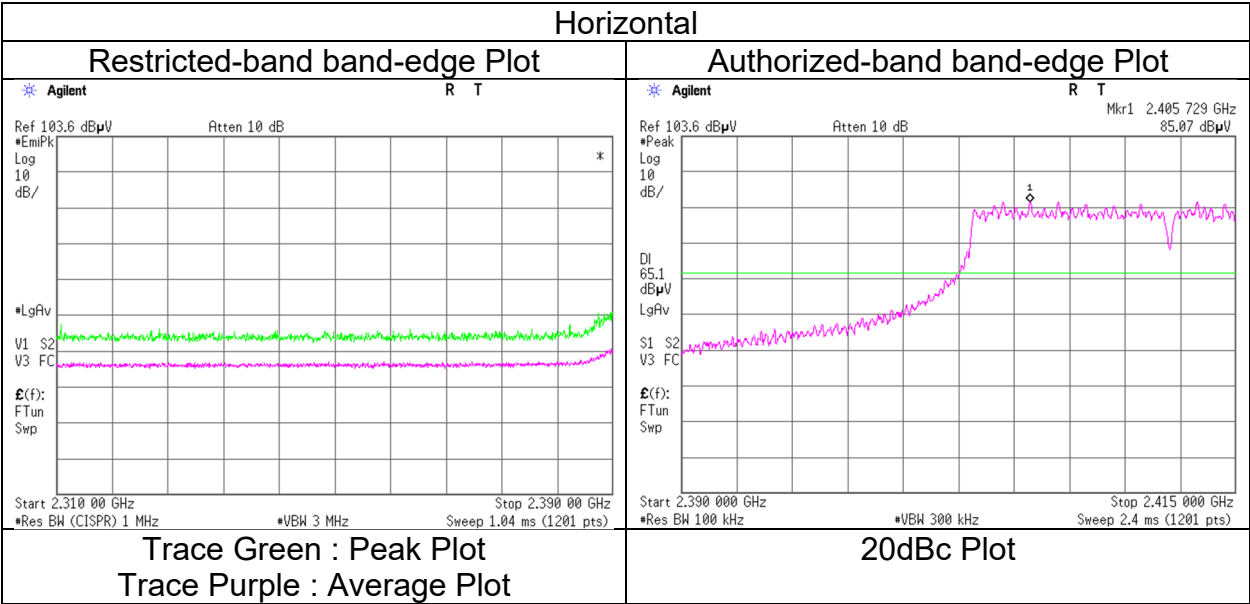
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 10 GHz : 20log (4.38 m / 3.0 m) = 3.29 dB

10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.10
Date	April 17, 2024
Temperature / Humidity	22 deg. C / 48 % RH
Engineer	Hiromitsu Tanabe
	(1 GHz to 2.8 GHz)
Mode	Tx 11n-20 2412 MHz



* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge and authorized band edge were shown in tabular data.

Radiated Spurious Emission

Test place	Kashima EMC Lab.			
Semi Anechoic Chamber	No.10	No.10	No.10	No.10
Date	April 17, 2024	June 11, 2024	April 18, 2024	April 18, 2024
Temperature / Humidity	22 deg. C / 48 % RH	23 deg. C / 56 % RH	19 deg. C / 52 % RH	19 deg. C / 52 % RH
Engineer	Hiromitsu Tanabe	Kazuhiro Ando	Hiromitsu Tanabe	Hiromitsu Tanabe
	(1 GHz to 2.8 GHz)	(2.8 GHz to 10 GHz)	(10 GHz to 18 GHz)	(18 GHz to 26.5 GHz)
Mode	Tx 11n-20 2437 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.	4874.000	PK	51.43	32.56	5.46	45.15	3.29	47.59	73.9	26.3	150	0	Floor noise
Hori.	6396.000	PK	51.78	35.30	6.17	45.06	3.29	51.48	73.9	22.4	121	265	-
Hori.	7311.000	PK	48.53	37.37	6.69	43.73	3.29	52.15	73.9	21.7	150	0	Floor noise
Hori.	9748.000	PK	47.31	37.90	7.51	41.77	3.29	54.24	73.9	19.6	150	0	Floor noise
Hori.	10000.000	PK	51.33	38.18	7.63	41.86	-9.54	45.74	73.9	28.1	226	30	-
Hori.	4874.000	AV	41.47	32.56	5.46	45.15	3.29	37.63	53.9	16.2	150	0	Floor noise
Hori.	6396.000	AV	43.40	35.30	6.17	45.06	3.29	43.10	53.9	10.8	121	265	-
Hori.	7311.000	AV	39.35	37.37	6.69	43.73	3.29	42.97	53.9	10.9	150	0	Floor noise
Hori.	9748.000	AV	37.74	37.90	7.51	41.77	3.29	44.67	53.9	9.2	150	0	Floor noise
Hori.	10000.000	AV	42.78	38.18	7.63	41.86	-9.54	37.19	53.9	16.7	226	30	-
Vert.	4874.000	PK	50.44	32.56	5.46	45.15	3.29	46.60	73.9	27.3	150	0	Floor noise
Vert.	6396.000	PK	52.17	35.30	6.17	45.06	3.29	51.87	73.9	22.0	177	203	-
Vert.	7311.000	PK	49.46	37.37	6.69	43.73	3.29	53.08	73.9	20.8	150	0	Floor noise
Vert.	9748.000	PK	47.00	37.90	7.51	41.77	3.29	53.93	73.9	19.9	150	0	Floor noise
Vert.	10000.000	PK	53.17	38.18	7.63	41.86	-9.54	47.58	73.9	26.3	211	40	-
Vert.	4874.000	AV	41.27	32.56	5.46	45.15	3.29	37.43	53.9	16.4	150	0	Floor noise
Vert.	6396.000	AV	43.67	35.30	6.17	45.06	3.29	43.37	53.9	10.5	177	203	-
Vert.	7311.000	AV	39.62	37.37	6.69	43.73	3.29	43.24	53.9	10.6	150	0	Floor noise
Vert.	9748.000	AV	37.57	37.90	7.51	41.77	3.29	44.50	53.9	9.4	150	0	Floor noise
Vert.	10000.000	AV	47.12	38.18	7.63	41.86	-9.54	41.53	53.9	12.3	211	40	-

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

Distance factor : 1 GHz - 10 GHz : 20log (4.38 m / 3.0 m) = 3.29 dB

10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission

Test place	Kashima EMC Lab.			
Semi Anechoic Chamber	No.10	No.10	No.10	No.10
Date	April 19, 2024	April 17, 2024	June 11, 2024	April 18, 2024
Temperature / Humidity	19 deg. C / 55 % RH	22 deg. C / 48 % RH	23 deg. C / 56 % RH	19 deg. C / 52 % RH
Engineer	Hiromitsu Tanabe	Hiromitsu Tanabe	Kazuhiro Ando	Hiromitsu Tanabe
	(30 MHz to 1 GHz)	(1 GHz to 2.8 GHz)	(2.8 GHz to 10 GHz)	(10 GHz to 26.5 GHz)
Mode	Tx 11n-20 2462 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.	99.819	QP	45.50	9.03	6.63	31.21	0.00	29.95	43.5	13.5	322	189	-
Hori.	366.000	QP	35.70	14.86	8.56	30.96	0.00	28.16	46.0	17.8	100	142	-
Hori.	499.094	QP	37.30	17.79	9.26	30.87	0.00	33.48	46.0	12.5	200	196	-
Hori.	698.730	QP	39.70	20.87	10.13	30.71	0.00	39.99	46.0	6.0	100	222	-
Hori.	2483.500	PK	58.89	27.86	13.07	43.62	3.29	59.49	73.9	14.4	245	54	-
Hori.	4924.000	PK	51.41	32.58	5.48	45.18	3.29	47.58	73.9	26.3	150	0	Floor noise
Hori.	6396.000	PK	51.69	35.30	6.17	45.06	3.29	51.39	73.9	22.5	173	274	-
Hori.	7386.000	PK	49.12	37.42	6.71	43.56	3.29	52.98	73.9	20.9	150	0	Floor noise
Hori.	9848.000	PK	47.59	38.02	7.55	41.70	3.29	54.75	73.9	19.1	150	0	Floor noise
Hori.	10000.000	PK	52.45	38.18	7.63	41.86	-9.54	46.86	73.9	27.0	143	27	-
Hori.	4924.000	AV	41.57	32.58	5.48	45.18	3.29	37.74	53.9	16.1	150	0	Floor noise
Hori.	6396.000	AV	43.06	35.30	6.17	45.06	3.29	42.76	53.9	11.1	173	274	-
Hori.	7386.000	AV	39.95	37.42	6.71	43.56	3.29	43.81	53.9	10.0	150	0	Floor noise
Hori.	9848.000	AV	38.09	38.02	7.55	41.70	3.29	45.25	53.9	8.6	150	0	Floor noise
Hori.	10000.000	AV	45.06	38.18	7.63	41.86	-9.54	39.47	53.9	14.4	143	27	-
Vert.	35.254	QP	44.60	12.76	5.84	31.32	0.00	31.88	40.0	8.1	100	184	-
Vert.	166.226	QP	32.90	13.26	7.21	31.12	0.00	22.25	43.5	21.2	100	112	-
Vert.	180.162	QP	35.20	11.97	7.33	31.10	0.00	23.40	43.5	20.1	100	101	-
Vert.	210.360	QP	44.00	9.81	7.55	31.04	0.00	30.32	43.5	13.1	100	160	-
Vert.	366.006	QP	37.00	14.86	8.56	30.96	0.00	29.46	46.0	16.5	100	191	-
Vert.	499.094	QP	36.80	17.79	9.26	30.87	0.00	32.98	46.0	13.0	100	214	-
Vert.	698.730	QP	36.10	20.87	10.13	30.71	0.00	36.39	46.0	9.6	100	59	-
Vert.	2483.500	PK	61.34	27.86	13.07	43.62	3.29	61.94	73.9	11.9	284	345	-
Vert.	4924.000	PK	51.04	32.58	5.48	45.18	3.29	47.21	73.9	26.6	150	0	Floor noise
Vert.	6396.000	PK	52.42	35.30	6.17	45.06	3.29	52.12	73.9	21.7	157	202	-
Vert.	7386.000	PK	49.21	37.42	6.71	43.56	3.29	53.07	73.9	20.8	150	0	Floor noise
Vert.	9848.000	PK	47.78	38.02	7.55	41.70	3.29	54.94	73.9	18.9	150	0	Floor noise
Vert.	10000.000	PK	54.19	38.18	7.63	41.86	-9.54	48.60	73.9	25.3	201	40	-
Vert.	4924.000	AV	41.59	32.58	5.48	45.18	3.29	37.76	53.9	16.1	150	0	Floor noise
Vert.	6396.000	AV	44.07	35.30	6.17	45.06	3.29	43.77	53.9	10.1	157	202	-
Vert.	7386.000	AV	40.06	37.42	6.71	43.56	3.29	43.92	53.9	9.9	150	0	Floor noise
Vert.	9848.000	AV	38.16	38.02	7.55	41.70	3.29	45.32	53.9	8.5	150	0	Floor noise
Vert.	10000.000	AV	48.02	38.18	7.63	41.86	-9.54	42.43	53.9	11.4	201	40	-

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

Distance factor : 1 GHz - 10 GHz : 20log (4.38 m / 3.0 m) = 3.29 dB

10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Average measurement value with duty factor

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	47.87	27.86	13.07	43.62	0.57	3.29	49.04	53.9	4.8	-
Vert.	2483.500	AV	49.66	27.86	13.07	43.62	0.57	3.29	50.83	53.9	3.0	-

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

Distance factor : 1 GHz - 10 GHz : 20log (4.38 m / 3.0 m) = 3.29 dB

10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

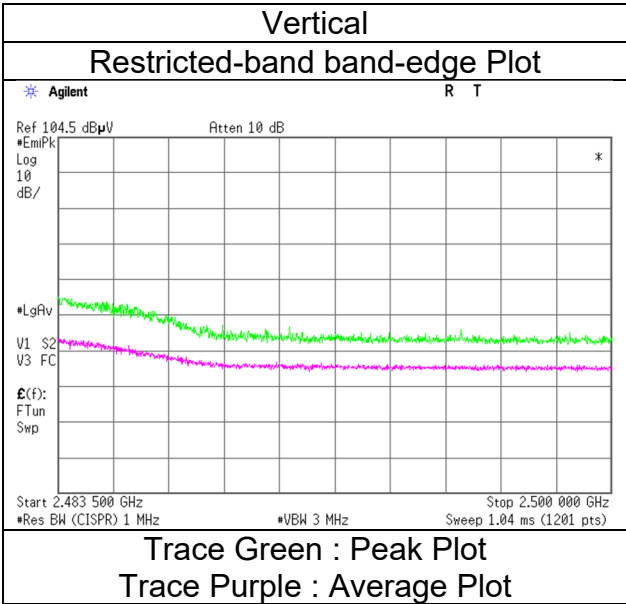
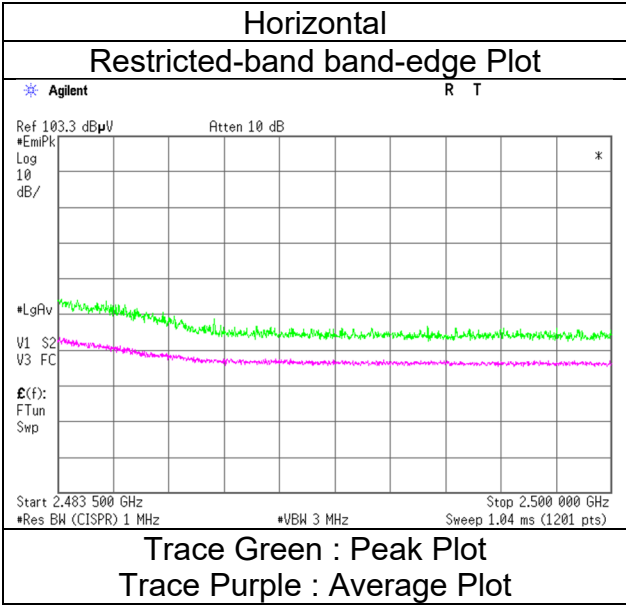
Duty factor refer to "Burst rate confirmation" sheet.

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer

Mode

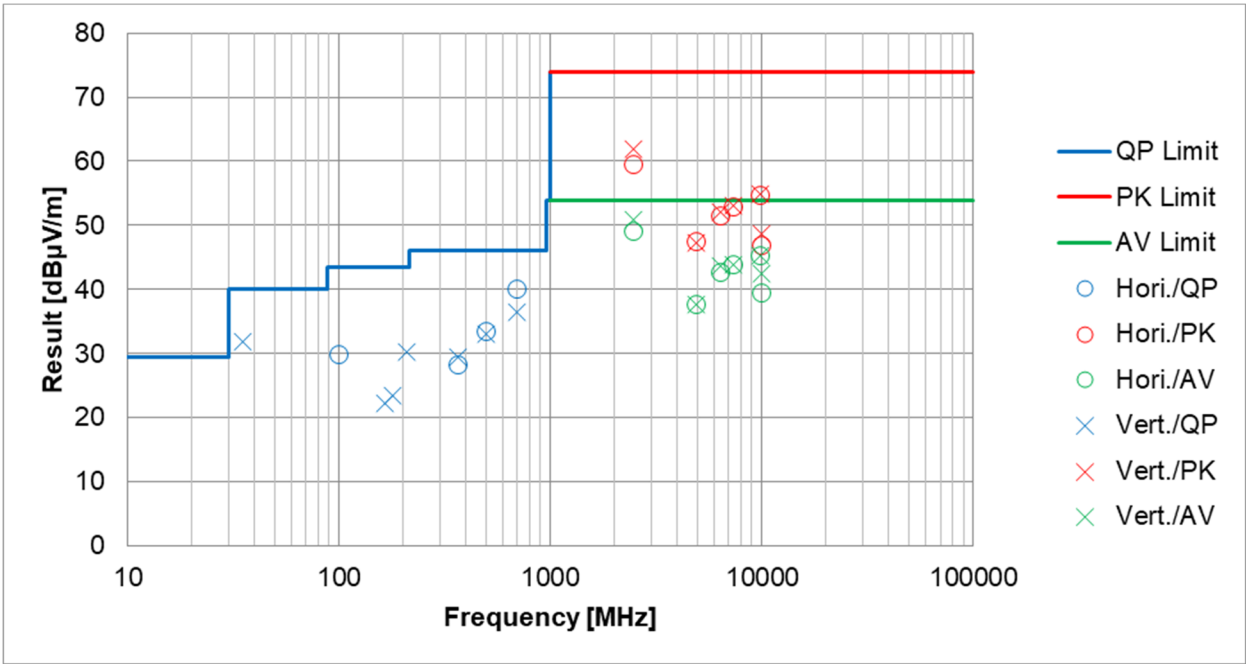
Kashima EMC Lab.
No.10
April 17, 2024
22 deg. C / 48 % RH
Hiromitsu Tanabe
(1 GHz to 2.8 GHz)
Tx 11n-20 2462 MHz



* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission
(Plot data, Worst case mode for Maximum Peak Output Power)

Test place	Kashima EMC Lab.	No.10	No.10	No.10
Semi Anechoic Chamber	No.10	No.10	No.10	No.10
Date	April 19, 2024	April 17, 2024	June 11, 2024	April 18, 2024
Temperature / Humidity	19 deg. C / 55 % RH	22 deg. C / 48 % RH	23 deg. C / 56 % RH	19 deg. C / 52 % RH
Engineer	Hiromitsu Tanabe	Hiromitsu Tanabe	Kazuhiro Ando	Hiromitsu Tanabe
	(30 MHz to 1 GHz)	(1 GHz to 2.8 GHz)	(2.8 GHz to 10 GHz)	(10 GHz to 26.5 GHz)
Mode	Tx 11n-20 2462 MHz			



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

Radiated Spurious Emission

Test place	Kashima EMC Lab.			
Semi Anechoic Chamber	No.11	No.10	No.11	No.11
Date	April 16, 2024	June 12, 2024	April 16, 2024	April 16, 2024
Temperature / Humidity	21 deg. C / 60 % RH	22 deg. C / 52 % RH	19 deg. C / 50 % RH	19 deg. C / 50 % RH
Engineer	Kazuhiro Ando	Kazuhiro Ando	Hiromitsu Tanabe	Hiromitsu Tanabe
	(1 GHz to 2.8 GHz)	(2.8 GHz to 10 GHz)	(10 GHz to 18 GHz)	(18 GHz to 26.5 GHz)
Mode	Tx BT LE 1M-PHY 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.	2390.000	PK	54.43	27.46	13.60	46.26	2.23	51.46	73.9	22.4	191	44	-
Hori.	4804.000	PK	50.24	32.53	5.29	45.10	3.29	46.25	73.9	27.6	150	0	Floor noise
Hori.	6396.000	PK	51.36	35.30	6.17	45.06	3.29	51.06	73.9	22.8	122	272	-
Hori.	7206.000	PK	48.88	37.14	6.56	43.99	3.29	51.88	73.9	22.0	150	0	Floor noise
Hori.	9608.000	PK	47.23	38.01	7.39	41.93	3.29	53.99	73.9	19.9	150	0	Floor noise
Hori.	2390.000	AV	44.59	27.46	13.60	46.26	2.23	41.62	53.9	12.2	191	44	-
Hori.	4804.000	AV	38.30	32.53	5.29	45.10	3.29	34.31	53.9	19.5	150	0	Floor noise
Hori.	6396.000	AV	40.98	35.30	6.17	45.06	3.29	40.68	53.9	13.2	122	272	-
Hori.	7206.000	AV	37.04	37.14	6.56	43.99	3.29	40.04	53.9	13.8	150	0	Floor noise
Hori.	9608.000	AV	35.11	38.01	7.39	41.93	3.29	41.87	53.9	12.0	150	0	Floor noise
Vert.	2390.000	PK	53.47	27.46	13.60	46.26	2.23	50.50	73.9	23.4	206	124	-
Vert.	4804.000	PK	51.18	32.53	5.29	45.10	3.29	47.19	73.9	26.7	150	0	Floor noise
Vert.	6396.000	PK	53.05	35.30	6.17	45.06	3.29	52.75	73.9	21.1	171	201	-
Vert.	7206.000	PK	49.56	37.14	6.56	43.99	3.29	52.56	73.9	21.3	150	0	Floor noise
Vert.	9608.000	PK	47.25	38.01	7.39	41.93	3.29	54.01	73.9	19.8	150	0	Floor noise
Vert.	2390.000	AV	44.60	27.46	13.60	46.26	2.23	41.63	53.9	12.2	206	124	-
Vert.	4804.000	AV	38.53	32.53	5.29	45.10	3.29	34.54	53.9	19.3	150	0	Floor noise
Vert.	6396.000	AV	41.26	35.30	6.17	45.06	3.29	40.96	53.9	12.9	171	201	-
Vert.	7206.000	AV	36.67	37.14	6.56	43.99	3.29	39.67	53.9	14.2	150	0	Floor noise
Vert.	9608.000	AV	35.40	38.01	7.39	41.93	3.29	42.16	53.9	11.7	150	0	Floor noise

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

Distance factor : 1 GHz - 2.8 GHz: $20\log(3.88\text{ m} / 3.0\text{ m}) = 2.23\text{ dB}$ (11 site) / 2.8 GHz - 10 GHz: $20\log(4.38\text{ m} / 3.0\text{ m}) = 3.29\text{ dB}$ (10 site)

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

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	102.48	27.45	13.61	46.25	2.23	99.52	-	-	Carrier
Hori.	2400.000	PK	48.16	27.44	13.61	46.25	2.23	45.19	79.5	34.3	-
Vert.	2402.000	PK	99.02	27.45	13.61	46.25	2.23	96.06	-	-	Carrier
Vert.	2400.000	PK	45.98	27.44	13.61	46.25	2.23	43.01	76.1	33.0	-

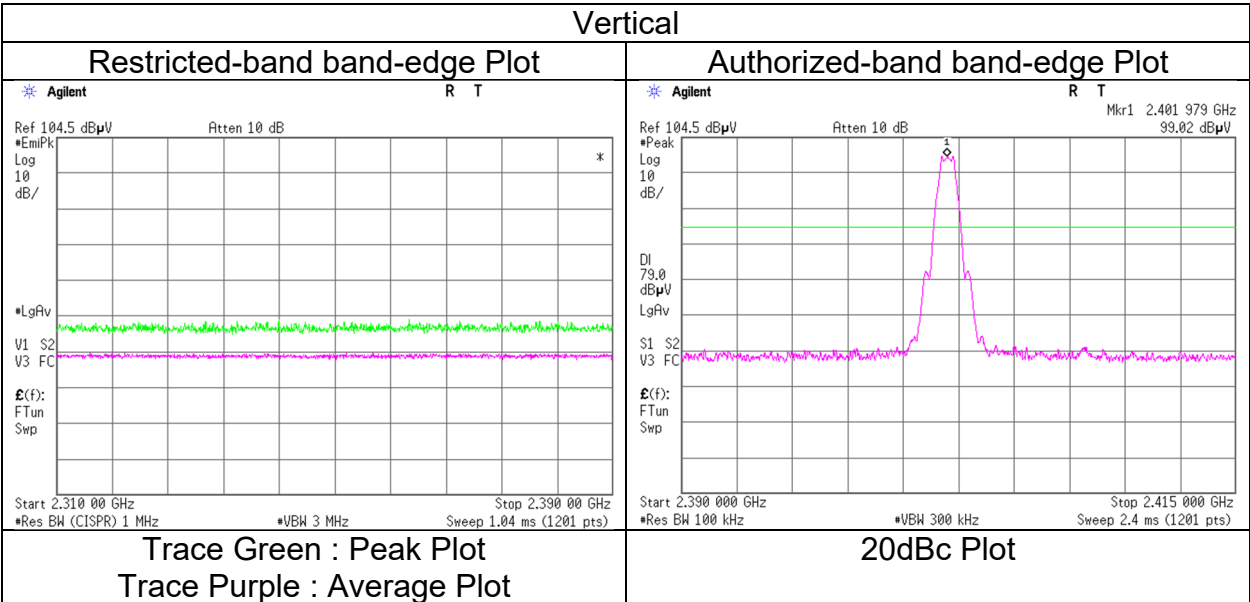
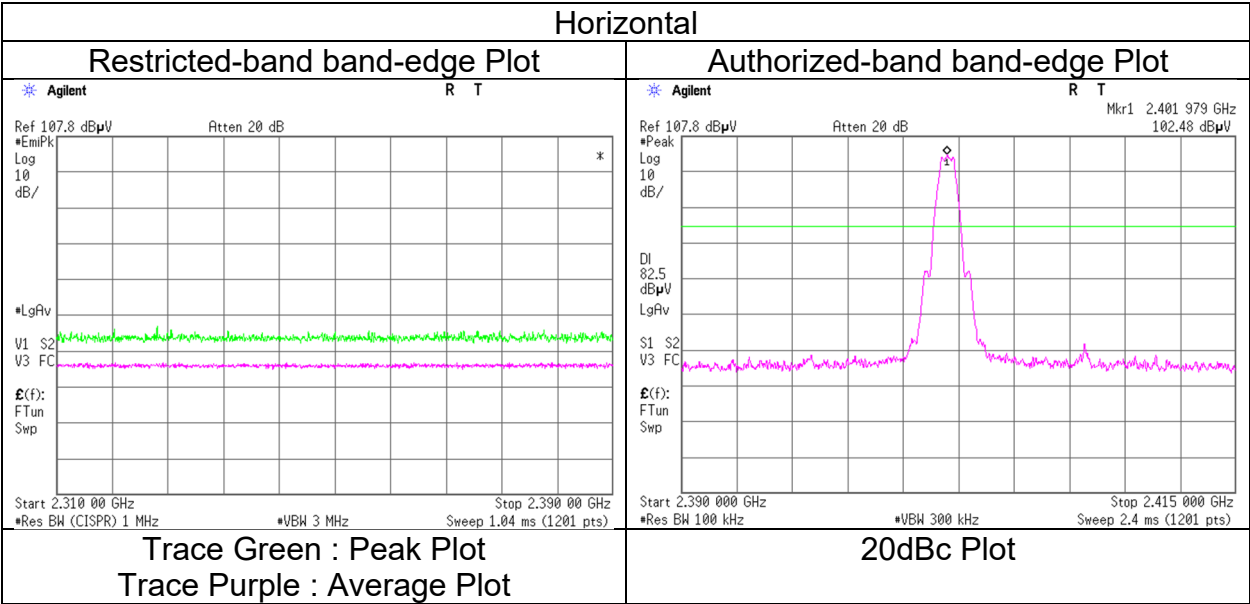
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 2.8 GHz: $20\log(3.88\text{ m} / 3.0\text{ m}) = 2.23\text{ dB}$ (11 site) / 2.8 GHz - 10 GHz: $20\log(4.38\text{ m} / 3.0\text{ m}) = 3.29\text{ dB}$ (10 site)

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

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.11
Date	April 16, 2024
Temperature / Humidity	21 deg. C / 60 % RH
Engineer	Kazuhiro Ando
	(1 GHz to 2.8 GHz)
Mode	Tx BT LE 1M-PHY 2402 MHz



* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge and authorized band edge were shown in tabular data.

Radiated Spurious Emission

Test place Kashima EMC Lab.
Semi Anechoic Chamber No.11
Date April 16, 2024
Temperature / Humidity 21 deg. C / 60 % RH
Engineer Kazuhiro Ando
Mode Tx BT LE 1M-PHY 2440 MHz

No.10
June 12, 2024
22 deg. C / 52 % RH
Kazuhiro Ando
(2.8 GHz to 10 GHz)

No.11
April 16, 2024
19 deg. C / 50 % RH
Hiromitsu Tanabe
(10 GHz to 18 GHz)

No.11
April 16, 2024
19 deg. C / 50 % RH
Hiromitsu Tanabe
(18 GHz to 26.5 GHz)

(* 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.	4880.000	PK	49.81	32.55	5.35	45.15	3.29	45.85	73.9	28.0	150	0	Floor noise
Hori.	6396.000	PK	51.55	35.30	6.17	45.06	3.29	51.25	73.9	22.6	199	258	-
Hori.	7320.000	PK	50.04	37.38	6.62	43.72	3.29	53.61	73.9	20.2	150	0	Floor noise
Hori.	9760.000	PK	46.79	37.91	7.45	41.76	3.29	53.68	73.9	20.2	150	0	Floor noise
Hori.	4880.000	AV	38.34	32.55	5.35	45.15	3.29	34.38	53.9	19.5	150	0	Floor noise
Hori.	6396.000	AV	40.87	35.30	6.17	45.06	3.29	40.57	53.9	13.3	199	258	-
Hori.	7320.000	AV	36.59	37.38	6.62	43.72	3.29	40.16	53.9	13.7	150	0	Floor noise
Hori.	9760.000	AV	35.18	37.91	7.45	41.76	3.29	42.07	53.9	11.8	150	0	Floor noise
Vert.	4880.000	PK	49.77	32.55	5.35	45.15	3.29	45.81	73.9	28.0	150	0	Floor noise
Vert.	6396.000	PK	51.87	35.30	6.17	45.06	3.29	51.57	73.9	22.3	157	201	-
Vert.	7320.000	PK	48.38	37.38	6.62	43.72	3.29	51.95	73.9	21.9	150	0	Floor noise
Vert.	9760.000	PK	46.49	37.91	7.45	41.76	3.29	53.38	73.9	20.5	150	0	Floor noise
Vert.	4880.000	AV	38.31	32.55	5.35	45.15	3.29	34.35	53.9	19.5	150	0	Floor noise
Vert.	6396.000	AV	41.01	35.30	6.17	45.06	3.29	40.71	53.9	13.1	157	201	-
Vert.	7320.000	AV	36.61	37.38	6.62	43.72	3.29	40.18	53.9	13.7	150	0	Floor noise
Vert.	9760.000	AV	35.15	37.91	7.45	41.76	3.29	42.04	53.9	11.8	150	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor
Distance factor : 1 GHz - 2.8 GHz: 20log (3.88 m / 3.0 m) = 2.23 dB (11 site) / 2.8 GHz - 10 GHz: 20log (4.38 m / 3.0 m) = 3.29 dB (10 site)
10 GHz - 40 GHz: 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission

Test place	Kashima EMC Lab.			
Semi Anechoic Chamber	No.10	No.11	No.10	No.11
Date	April 19, 2024	April 16, 2024	June 12, 2024	April 16, 2024
Temperature / Humidity	19 deg. C / 55 % RH	21 deg. C / 60 % RH	22 deg. C / 52 % RH	19 deg. C / 50 % RH
Engineer	Hiromitsu Tanabe	Kazuhiro Ando	Kazuhiro Ando	Hiromitsu Tanabe
	(30 MHz to 1 GHz)	(1 GHz to 2.8 GHz)	(2.8 GHz to 10 GHz)	(10 GHz to 26.5 GHz)
Mode	Tx BT LE 1M-PHY 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.	99.819	QP	46.30	9.03	6.63	31.21	0.00	30.75	43.5	12.7	325	325	-
Hori.	366.020	QP	36.20	14.86	8.56	30.96	0.00	28.66	46.0	17.3	100	50	-
Hori.	499.093	QP	38.70	17.79	9.26	30.87	0.00	34.88	46.0	11.1	161	197	-
Hori.	698.730	QP	37.90	20.87	10.13	30.71	0.00	38.19	46.0	7.8	100	231	-
Hori.	2483.500	PK	55.38	27.94	13.68	46.16	2.23	53.07	73.9	20.8	189	43	-
Hori.	4960.000	PK	50.22	32.64	5.40	45.20	3.29	46.35	73.9	27.5	150	0	Floor noise
Hori.	6396.000	PK	50.74	35.30	6.17	45.06	3.29	50.44	73.9	23.4	202	262	-
Hori.	7440.000	PK	48.88	37.41	6.68	43.45	3.29	52.81	73.9	21.0	150	0	Floor noise
Hori.	9920.000	PK	47.20	38.11	7.55	41.76	3.29	54.39	73.9	19.5	150	0	Floor noise
Hori.	2483.500	AV	45.76	27.94	13.68	46.16	2.23	43.45	53.9	10.4	189	43	-
Hori.	4960.000	AV	38.57	32.64	5.40	45.20	3.29	34.70	53.9	19.2	150	0	Floor noise
Hori.	6396.000	AV	41.06	35.30	6.17	45.06	3.29	40.76	53.9	13.1	202	262	-
Hori.	7440.000	AV	36.91	37.41	6.68	43.45	3.29	40.84	53.9	13.0	150	0	Floor noise
Hori.	9920.000	AV	35.21	38.11	7.55	41.76	3.29	42.40	53.9	11.5	150	0	Floor noise
Vert.	33.771	QP	44.90	12.56	5.82	31.33	0.00	31.95	40.0	8.0	100	193	-
Vert.	142.413	QP	33.40	13.11	7.01	31.14	0.00	22.38	43.5	21.1	100	125	-
Vert.	166.363	QP	36.40	13.25	7.21	31.12	0.00	25.74	43.5	17.7	100	134	-
Vert.	178.998	QP	40.00	12.16	7.32	31.10	0.00	28.38	43.5	15.1	100	129	-
Vert.	210.360	QP	45.40	9.81	7.55	31.04	0.00	31.72	43.5	11.7	100	162	-
Vert.	499.094	QP	35.40	17.79	9.26	30.87	0.00	31.58	46.0	14.4	100	355	-
Vert.	698.730	QP	36.00	20.87	10.13	30.71	0.00	36.29	46.0	9.7	100	58	-
Vert.	2483.500	PK	54.11	27.94	13.68	46.16	2.23	51.80	73.9	22.1	209	117	-
Vert.	4960.000	PK	50.37	32.64	5.40	45.20	3.29	46.50	73.9	27.4	150	0	Floor noise
Vert.	6396.000	PK	52.10	35.30	6.17	45.06	3.29	51.80	73.9	22.1	156	200	-
Vert.	7440.000	PK	48.79	37.41	6.68	43.45	3.29	52.72	73.9	21.1	150	0	Floor noise
Vert.	9920.000	PK	47.77	38.11	7.55	41.76	3.29	54.96	73.9	18.9	150	0	Floor noise
Vert.	2483.500	AV	45.55	27.94	13.68	46.16	2.23	43.24	53.9	10.6	209	117	-
Vert.	4960.000	AV	38.58	32.64	5.40	45.20	3.29	34.71	53.9	19.1	150	0	Floor noise
Vert.	6396.000	AV	41.42	35.30	6.17	45.06	3.29	41.12	53.9	12.7	156	200	-
Vert.	7440.000	AV	36.93	37.41	6.68	43.45	3.29	40.86	53.9	13.0	150	0	Floor noise
Vert.	9920.000	AV	35.20	38.11	7.55	41.76	3.29	42.39	53.9	11.5	150	0	Floor noise

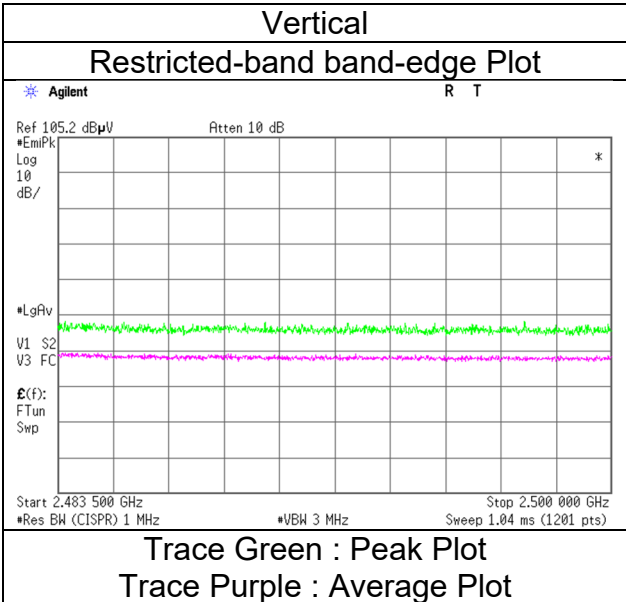
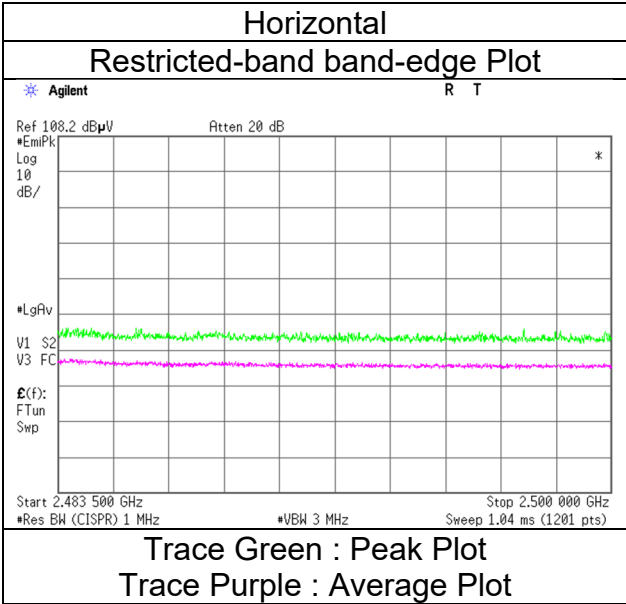
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor
Distance factor : 1 GHz - 2.8 GHz : 20log (3.88 m / 3.0 m) = 2.23 dB (11 site) / 2.8 GHz - 10 GHz : 20log (4.38 m / 3.0 m) = 3.29 dB (10 site)
10 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer

Mode

Kashima EMC Lab.
No.11
April 16, 2024
21 deg. C / 60 % RH
Kazuhiro Ando
(1 GHz to 2.8 GHz)
Tx BT LE 1M-PHY 2480 MHz



* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission

Test place Kashima EMC Lab.
Semi Anechoic Chamber No.11 No.10 No.11 No.11
Date April 16, 2024 June 12, 2024 April 16, 2024 April 16, 2024
Temperature / Humidity 21 deg. C / 60 % RH 22 deg. C / 52 % RH 19 deg. C / 50 % RH 19 deg. C / 50 % RH
Engineer Kazuhiro Ando Kazuhiro Ando Hiromitsu Tanabe Hiromitsu Tanabe
 (1 GHz to 2.8 GHz) (2.8 GHz to 10 GHz) (10 GHz to 18 GHz) (18 GHz to 26.5 GHz)
Mode Tx BT LE 2M-PHY 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.	2390.000	PK	54.06	27.46	13.60	46.26	2.23	51.09	73.9	22.8	190	48	-
Hori.	4804.000	PK	50.20	32.57	5.77	45.77	3.29	46.06	73.9	27.8	150	0	Floor noise
Hori.	6396.000	PK	50.73	35.28	6.83	45.24	3.29	50.89	73.9	23.0	165	270	-
Hori.	7206.000	PK	48.41	37.05	7.24	44.83	3.29	51.16	73.9	22.7	150	0	Floor noise
Hori.	9608.000	PK	47.05	37.94	8.02	43.17	3.29	53.13	73.9	20.7	150	0	Floor noise
Hori.	2390.000	AV	44.99	27.46	13.60	46.26	2.23	42.02	53.9	11.8	190	48	-
Hori.	4804.000	AV	38.25	32.57	5.77	45.77	3.29	34.11	53.9	19.7	150	0	Floor noise
Hori.	6396.000	AV	40.56	35.28	6.83	45.24	3.29	40.72	53.9	13.1	165	270	-
Hori.	7206.000	AV	36.96	37.05	7.24	44.83	3.29	39.71	53.9	14.1	150	0	Floor noise
Hori.	9608.000	AV	35.12	37.94	8.02	43.17	3.29	41.20	53.9	12.7	150	0	Floor noise
Vert.	2390.000	PK	53.85	27.46	13.60	46.26	2.23	50.88	73.9	23.0	209	123	-
Vert.	4804.000	PK	50.78	32.57	5.77	45.77	3.29	46.64	73.9	27.2	150	0	Floor noise
Vert.	6396.000	PK	51.30	35.28	6.83	45.24	3.29	51.46	73.9	22.4	155	203	-
Vert.	7206.000	PK	48.71	37.05	7.24	44.83	3.29	51.46	73.9	22.4	150	0	Floor noise
Vert.	9608.000	PK	46.49	37.94	8.02	43.17	3.29	52.57	73.9	21.3	150	0	Floor noise
Vert.	2390.000	AV	44.77	27.46	13.60	46.26	2.23	41.80	53.9	12.1	209	123	-
Vert.	4804.000	AV	38.26	32.57	5.77	45.77	3.29	34.12	53.9	19.7	150	0	Floor noise
Vert.	6396.000	AV	41.41	35.28	6.83	45.24	3.29	41.57	53.9	12.3	155	203	-
Vert.	7206.000	AV	36.96	37.05	7.24	44.83	3.29	39.71	53.9	14.1	150	0	Floor noise
Vert.	9608.000	AV	35.13	37.94	8.02	43.17	3.29	41.21	53.9	12.6	150	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor
Distance factor : 1 GHz - 2.8 GHz: 20log (3.88 m / 3.0 m) = 2.23 dB (11 site) / 2.8 GHz - 10 GHz: 20log (4.38 m / 3.0 m) = 3.29 dB (10 site)
10 GHz - 40 GHz: 20log (1.0 m / 3.0 m) = -9.54 dB

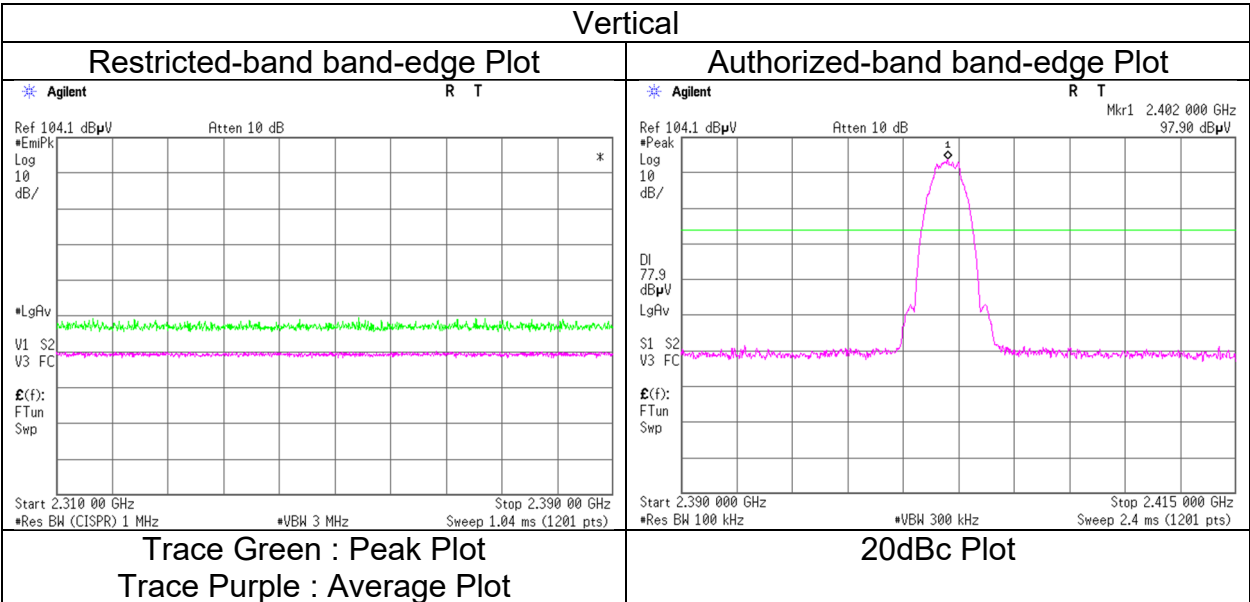
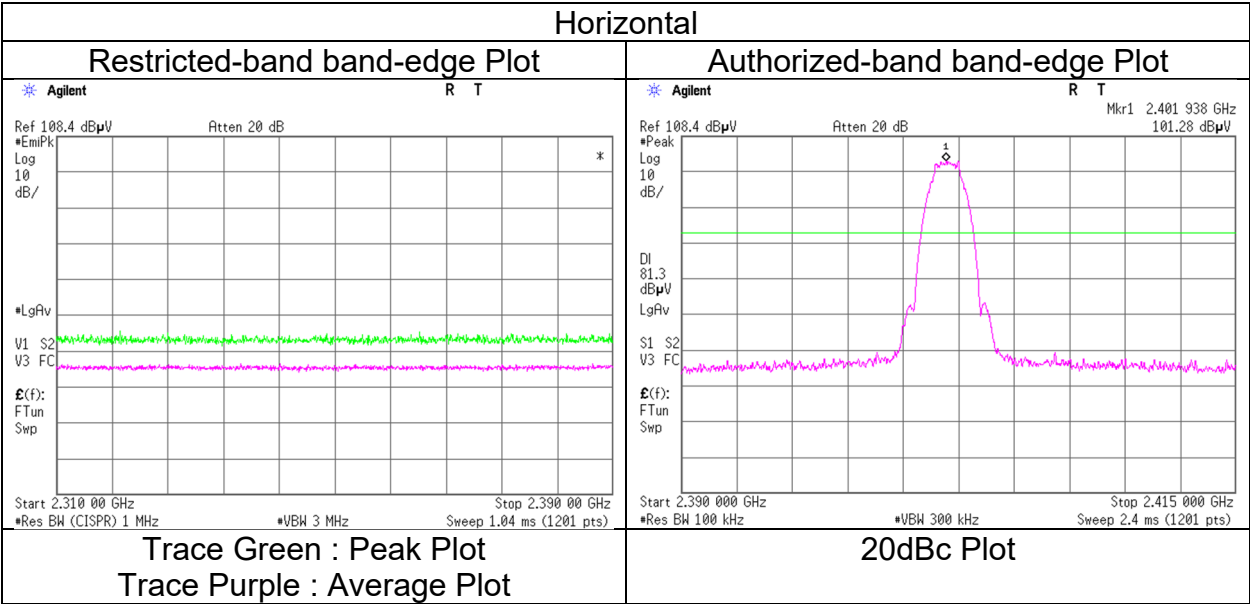
20 dBc Data Sheet (RBW 100 kHz, VBW 300 kHz)

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	101.28	27.45	13.61	46.25	2.23	98.32	-	-	Carrier
Hori.	2400.000	PK	56.28	27.44	13.61	46.25	2.23	53.31	78.3	25.0	-
Vert.	2402.000	PK	97.90	27.45	13.61	46.25	2.23	94.94	-	-	Carrier
Vert.	2400.000	PK	52.27	27.44	13.61	46.25	2.23	49.30	74.9	25.6	-

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor
Distance factor : 1 GHz - 2.8 GHz: 20log (3.88 m / 3.0 m) = 2.23 dB (11 site) / 2.8 GHz - 10 GHz: 20log (4.38 m / 3.0 m) = 3.29 dB (10 site)
10 GHz - 40 GHz: 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Kashima EMC Lab.
Semi Anechoic Chamber	No.11
Date	April 16, 2024
Temperature / Humidity	21 deg. C / 60 % RH
Engineer	Kazuhiro Ando
	(1 GHz to 2.8 GHz)
Mode	Tx BT LE 2M-PHY 2402 MHz



* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.
Final result of restricted band edge and authorized band edge were shown in tabular data.

Radiated Spurious Emission

Test place Kashima EMC Lab.
Semi Anechoic Chamber No.11 No.10 No.11 No.11
Date April 16, 2024 June 12, 2024 April 16, 2024 April 16, 2024
Temperature / Humidity 21 deg. C / 60 % RH 22 deg. C / 52 % RH 19 deg. C / 50 % RH 19 deg. C / 50 % RH
Engineer Kazuhiro Ando Kazuhiro Ando Hiromitsu Tanabe Hiromitsu Tanabe
 (1 GHz to 2.8 GHz) (2.8 GHz to 10 GHz) (10 GHz to 18 GHz) (18 GHz to 26.5 GHz)
Mode Tx BT LE 2M-PHY 2440 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.	4880.000	PK	50.35	32.59	5.82	45.76	3.29	46.29	73.9	27.6	150	0	Floor noise
Hori.	6396.000	PK	50.73	35.28	6.83	45.24	3.29	50.89	73.9	23.0	172	268	-
Hori.	7320.000	PK	47.78	37.39	7.29	44.64	3.29	51.11	73.9	22.7	150	0	Floor noise
Hori.	9760.000	PK	46.13	37.92	8.08	43.11	3.29	52.31	73.9	21.5	150	0	Floor noise
Hori.	4880.000	AV	38.30	32.59	5.82	45.76	3.29	34.24	53.9	19.6	150	0	Floor noise
Hori.	6396.000	AV	40.79	35.28	6.83	45.24	3.29	40.95	53.9	12.9	172	268	-
Hori.	7320.000	AV	36.61	37.39	7.29	44.64	3.29	39.94	53.9	13.9	150	0	Floor noise
Hori.	9760.000	AV	35.12	37.92	8.08	43.11	3.29	41.30	53.9	12.6	150	0	Floor noise
Vert.	4880.000	PK	50.64	32.59	5.82	45.76	3.29	46.58	73.9	27.3	150	0	Floor noise
Vert.	6396.000	PK	51.50	35.28	6.83	45.24	3.29	51.66	73.9	22.2	163	203	-
Vert.	7320.000	PK	48.31	37.39	7.29	44.64	3.29	51.64	73.9	22.2	150	0	Floor noise
Vert.	9760.000	PK	46.61	37.92	8.08	43.11	3.29	52.79	73.9	21.1	150	0	Floor noise
Vert.	4880.000	AV	38.29	32.59	5.82	45.76	3.29	34.23	53.9	19.6	150	0	Floor noise
Vert.	6396.000	AV	41.13	35.28	6.83	45.24	3.29	41.29	53.9	12.6	163	203	-
Vert.	7320.000	AV	36.61	37.39	7.29	44.64	3.29	39.94	53.9	13.9	150	0	Floor noise
Vert.	9760.000	AV	35.13	37.92	8.08	43.11	3.29	41.31	53.9	12.5	150	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor
Distance factor : 1 GHz - 2.8 GHz: 20log (3.88 m / 3.0 m) = 2.23 dB (11 site) / 2.8 GHz - 10 GHz: 20log (4.38 m / 3.0 m) = 3.29 dB (10 site)
10 GHz - 40 GHz: 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission

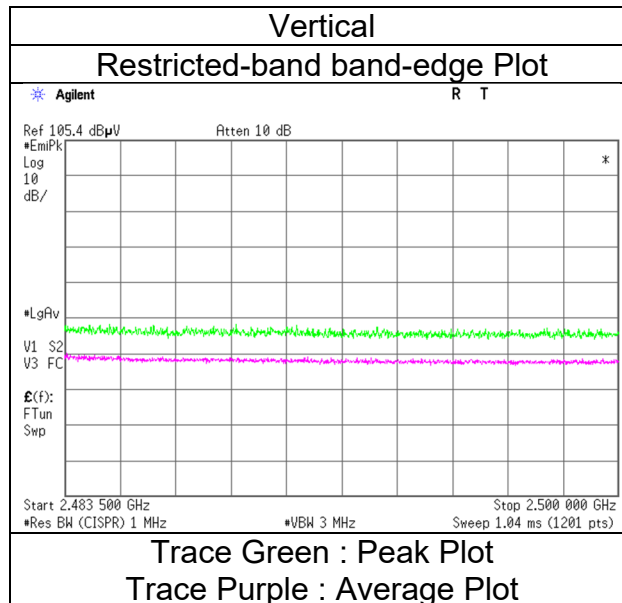
Test place Kashima EMC Lab.
Semi Anechoic Chamber No.11 No.10 No.11 No.11
Date April 16, 2024 June 12, 2024 April 16, 2024 April 16, 2024
Temperature / Humidity 21 deg. C / 60 % RH 22 deg. C / 52 % RH 19 deg. C / 50 % RH 19 deg. C / 50 % RH
Engineer Kazuhiro Ando Kazuhiro Ando Hiromitsu Tanabe Hiromitsu Tanabe
 (1 GHz to 2.8 GHz) (2.8 GHz to 10 GHz) (10 GHz to 18 GHz) (18 GHz to 26.5 GHz)
Mode Tx BT LE 2M-PHY 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.	2483.500	PK	57.50	27.94	13.68	46.16	2.23	55.19	73.9	18.7	187	53	-
Hori.	4960.000	PK	50.44	32.75	5.87	45.75	3.29	46.60	73.9	27.3	150	0	Floor noise
Hori.	6396.000	PK	51.38	35.28	6.83	45.24	3.29	51.54	73.9	22.3	121	265	-
Hori.	7440.000	PK	48.40	37.35	7.35	44.58	3.29	51.81	73.9	22.0	150	0	Floor noise
Hori.	9920.000	PK	47.46	38.08	8.17	43.21	3.29	53.79	73.9	20.1	150	0	Floor noise
Hori.	2483.500	AV	47.17	27.94	13.68	46.16	2.23	44.86	53.9	9.0	187	53	-
Hori.	4960.000	AV	38.56	32.75	5.87	45.75	3.29	34.72	53.9	19.1	150	0	Floor noise
Hori.	6396.000	AV	41.06	35.28	6.83	45.24	3.29	41.22	53.9	12.6	121	265	-
Hori.	7440.000	AV	36.92	37.35	7.35	44.58	3.29	40.33	53.9	13.5	150	0	Floor noise
Hori.	9920.000	AV	35.14	38.08	8.17	43.21	3.29	41.47	53.9	12.4	150	0	Floor noise
Vert.	2483.500	PK	54.77	27.94	13.68	46.16	2.23	52.46	73.9	21.4	239	94	-
Vert.	4960.000	PK	50.73	32.75	5.87	45.75	3.29	46.89	73.9	27.0	150	0	Floor noise
Vert.	6396.000	PK	52.36	35.28	6.83	45.24	3.29	52.52	73.9	21.3	162	201	-
Vert.	7440.000	PK	48.80	37.35	7.35	44.58	3.29	52.21	73.9	21.6	150	0	Floor noise
Vert.	9920.000	PK	47.21	38.08	8.17	43.21	3.29	53.54	73.9	20.3	150	0	Floor noise
Vert.	2483.500	AV	45.84	27.94	13.68	46.16	2.23	43.53	53.9	10.3	239	94	-
Vert.	4960.000	AV	38.53	32.75	5.87	45.75	3.29	34.69	53.9	19.2	150	0	Floor noise
Vert.	6396.000	AV	41.08	35.28	6.83	45.24	3.29	41.24	53.9	12.6	162	201	-
Vert.	7440.000	AV	36.89	37.35	7.35	44.58	3.29	40.30	53.9	13.6	150	0	Floor noise
Vert.	9920.000	AV	35.19	38.08	8.17	43.21	3.29	41.52	53.9	12.3	150	0	Floor noise

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor
Distance factor : 1 GHz - 2.8 GHz: 20log (3.88 m / 3.0 m) = 2.23 dB (11 site) / 2.8 GHz - 10 GHz: 20log (4.38 m / 3.0 m) = 3.29 dB (10 site)
10 GHz - 40 GHz: 20log (1.0 m / 3.0 m) = -9.54 dB

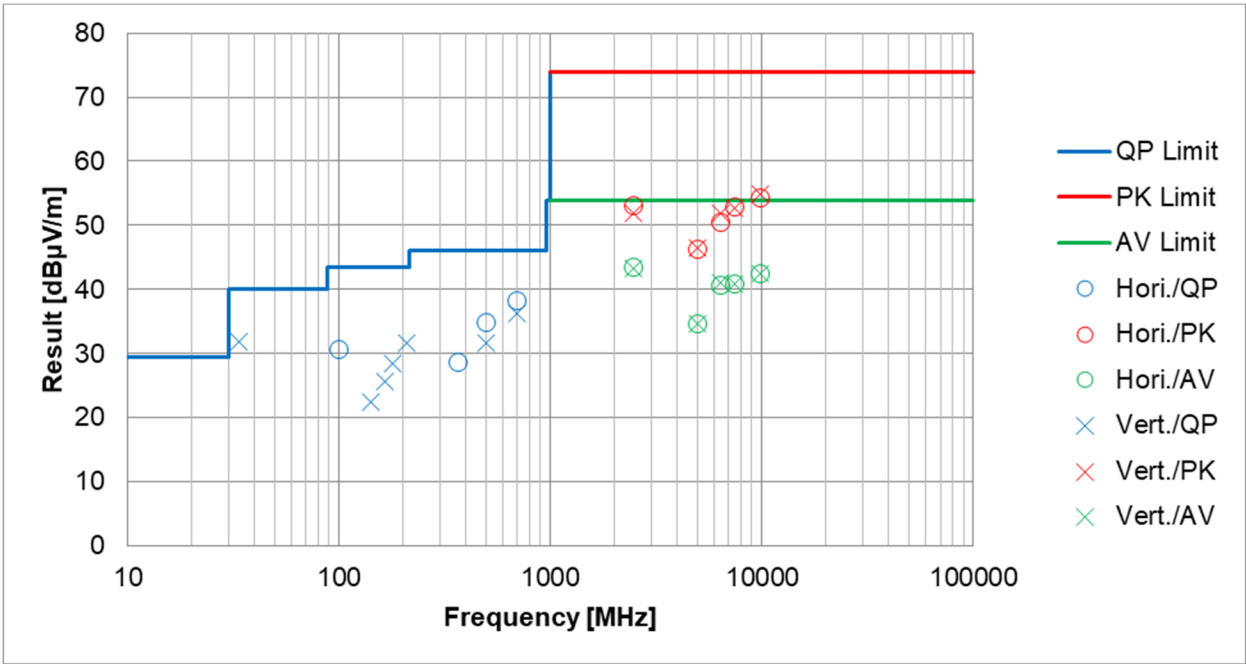
Test place
Semi Anechoic Chamber
Date
Temperature / Humidity
Engineer
Mode

Kashima EMC Lab.
No.11
April 16, 2024
21 deg. C / 60 % RH
Kazuhiro Ando
(1 GHz to 2.8 GHz)
Tx BT LE 2M-PHY 2480 MHz



Radiated Spurious Emission
(Plot data, Worst case mode for Maximum Peak Output Power)

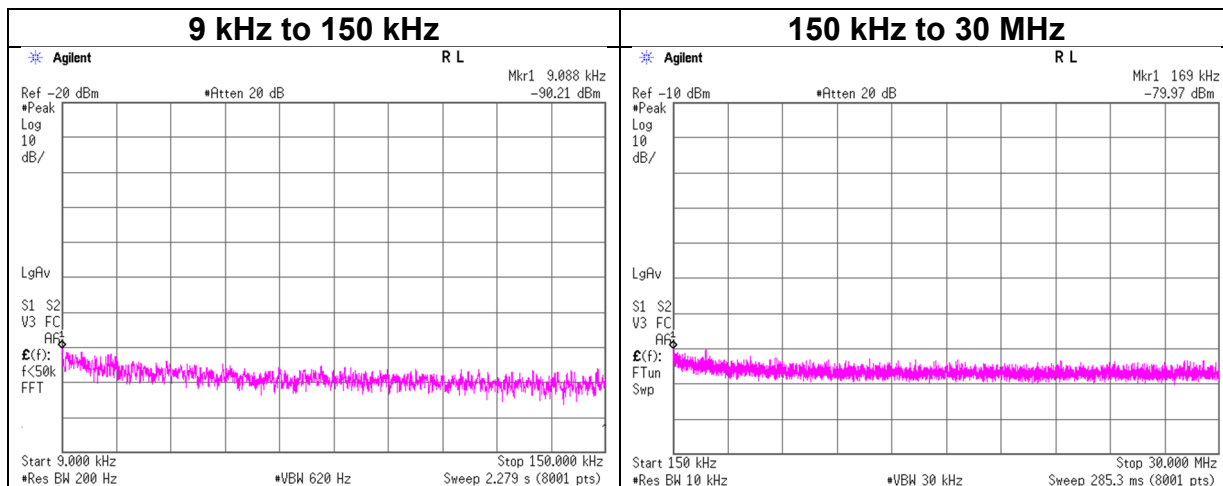
Test place	Kashima EMC Lab.			
Semi Anechoic Chamber	No.10	No.11	No.10	No.11
Date	April 19, 2024	April 16, 2024	June 12, 2024	April 16, 2024
Temperature / Humidity	19 deg. C / 55 % RH	21 deg. C / 60 % RH	22 deg. C / 52 % RH	19 deg. C / 50 % RH
Engineer	Hiromitsu Tanabe	Kazuhiro Ando	Kazuhiro Ando	Hiromitsu Tanabe
	(30 MHz to 1 GHz)	(1 GHz to 2.8 GHz)	(2.8 GHz to 10 GHz)	(10 GHz to 26.5 GHz)
Mode	Tx BT LE 1M-PHY 2480 MHz			



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

Conducted Spurious Emission

Test place Kashima EMC Lab. No.2 Measurement Room
Date May 7, 2024
Temperature / Humidity 23 deg. C / 53 % RH
Engineer Hiromitsu Tanabe
Mode Tx 11n-20 2462 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [dB]	Antenna Gain* [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
9.09	-90.2	0.01	9.9	2.0	1	-78.3	300	6.0	-17.0	48.4	65.4	
169.00	-80.0	0.01	9.9	2.0	1	-68.0	300	6.0	-6.8	23.0	29.8	

$$E \text{ [dBuV/m]} = \text{EIRP [dBm]} - 20 \log (\text{Distance [m]}) + \text{Ground bounce [dB]} + 104.8 \text{ [dBuV/m]}$$

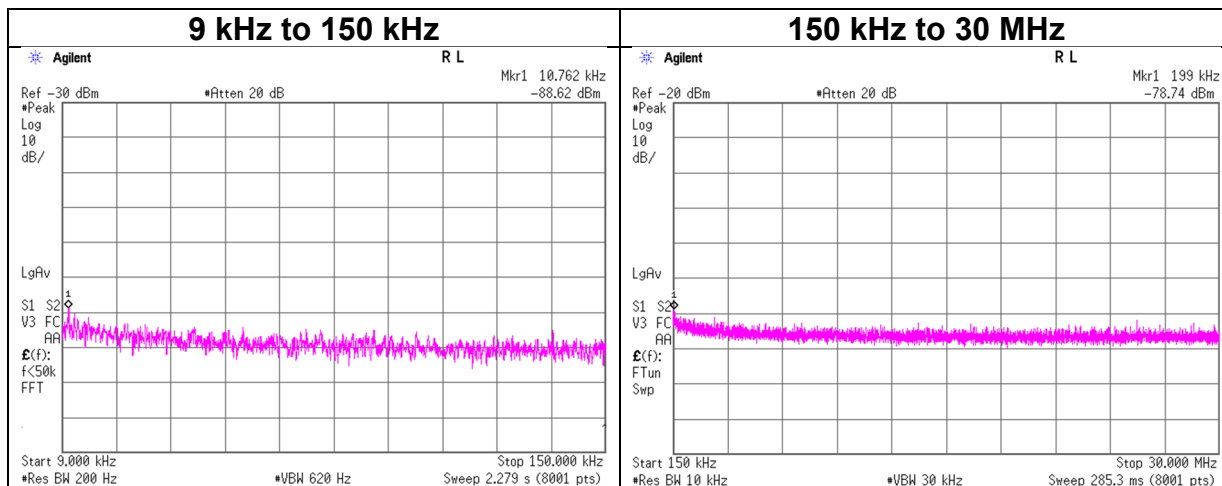
$$\text{EIRP [dBm]} = \text{Reading [dBm]} + \text{Cable loss [dB]} + \text{Attenuator Loss [dB]} + \text{Antenna gain [dBi]} + 10 * \log (N)$$

N: Number of output

*2.0 dBi was applied to the test result based on ANSI C63.10 since antenna gain was less than 2.0 dBi.

Conducted Spurious Emission

Test place Kashima EMC Lab. No.2 Measurement Room
Date May 7, 2024
Temperature / Humidity 23 deg. C / 53 % RH
Engineer Hiromitsu Tanabe
Mode Tx BT LE , 1M-PHY 2480 MHz



Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator Loss [dB]	Antenna Gain* [dBi]	N (Number of Output)	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
10.76	-88.6	0.01	9.9	2.0	1	-76.7	300	6.0	-15.4	46.9	62.3	
199.00	-78.7	0.01	9.9	2.0	1	-66.8	300	6.0	-5.5	21.6	27.1	

$E [dBuV/m] = EIRP [dBm] - 20 \log (Distance [m]) + Ground\ bounce [dB] + 104.8 [dBuV/m]$

$EIRP[dBm] = Reading [dBm] + Cable\ loss [dB] + Attenuator\ Loss [dB] + Antenna\ gain [dBi] + 10 * \log (N)$

N: Number of output

*2.0 dBi was applied to the test result based on ANSI C63.10 since antenna gain was less than 2.0 dBi.

Power Density

Test place
Date
Temperature / Humidity
Engineer
Mode

Kashima EMC Lab. No.2 Measurement Room
May 7, 2024
23 deg. C / 53 % RH
Hiromitsu Tanabe
Tx

11b

Freq. [MHz]	Reading [dBm / 3 kHz]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm / 3 kHz]	Limit [dBm / 3 kHz]	Margin [dB]
2412	-7.42	2.66	10.05	5.29	8.00	2.71
2437	-8.88	2.66	10.05	3.83	8.00	4.17
2462	-7.02	2.67	10.05	5.70	8.00	2.30

11g

Freq. [MHz]	Reading [dBm / 3 kHz]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm / 3 kHz]	Limit [dBm / 3 kHz]	Margin [dB]
2412	-26.70	2.66	10.05	-13.99	8.00	21.99
2437	-27.01	2.66	10.05	-14.30	8.00	22.30
2462	-26.28	2.67	10.05	-13.56	8.00	21.56

11n-20

Freq. [MHz]	Reading [dBm / 3 kHz]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm / 3 kHz]	Limit [dBm / 3 kHz]	Margin [dB]
2412	-26.01	2.66	10.05	-13.30	8.00	21.30
2437	-26.24	2.66	10.05	-13.53	8.00	21.53
2462	-26.03	2.67	10.05	-13.31	8.00	21.31

1M-PHY

Freq. [MHz]	Reading [dBm / 3 kHz]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm / 3 kHz]	Limit [dBm / 3 kHz]	Margin [dB]
2412	-22.40	2.66	10.05	-9.69	8.00	17.69
2437	-23.20	2.67	10.05	-10.48	8.00	18.48
2462	-23.84	2.68	10.05	-11.11	8.00	19.11

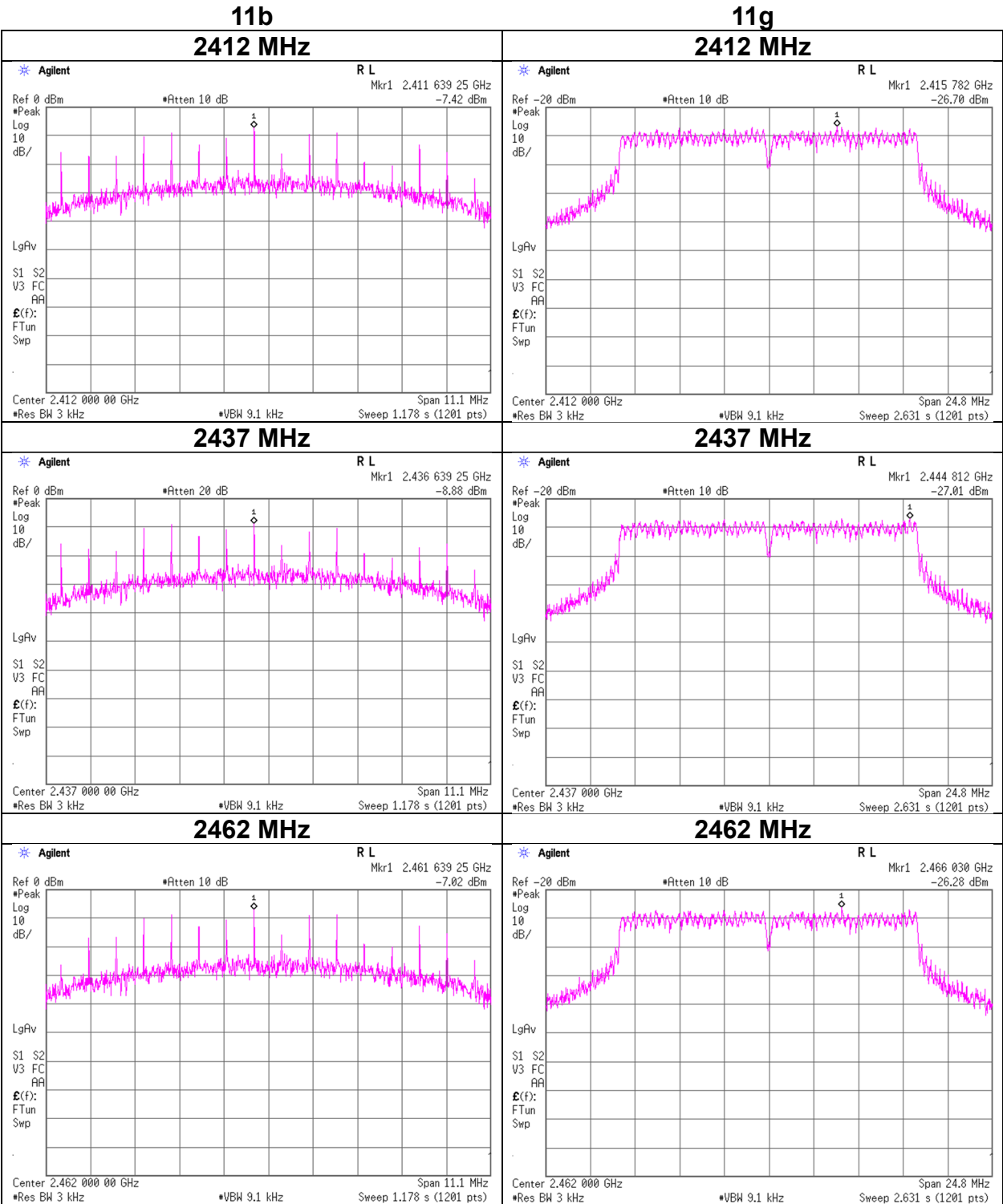
2M-PHY

Freq. [MHz]	Reading [dBm / 3 kHz]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm / 3 kHz]	Limit [dBm / 3 kHz]	Margin [dB]
2412	-25.69	2.66	10.05	-12.98	8.00	20.98
2437	-26.61	2.67	10.05	-13.89	8.00	21.89
2462	-25.88	2.68	10.05	-13.15	8.00	21.15

Sample Calculation:

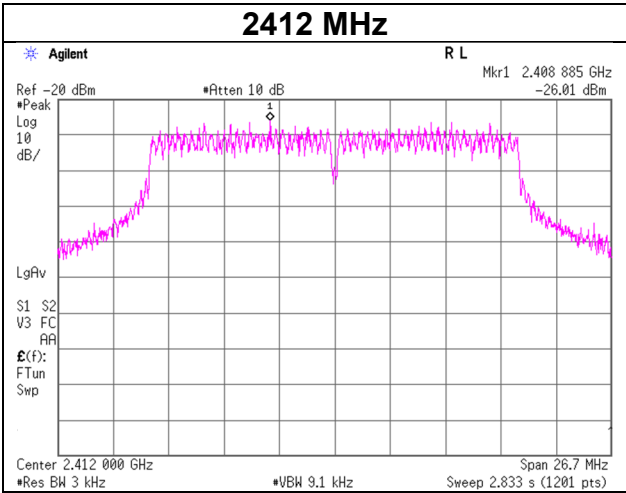
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

Power Density

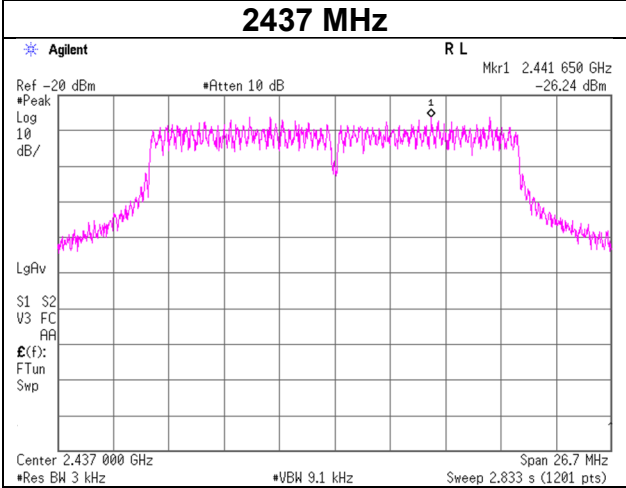


Power Density

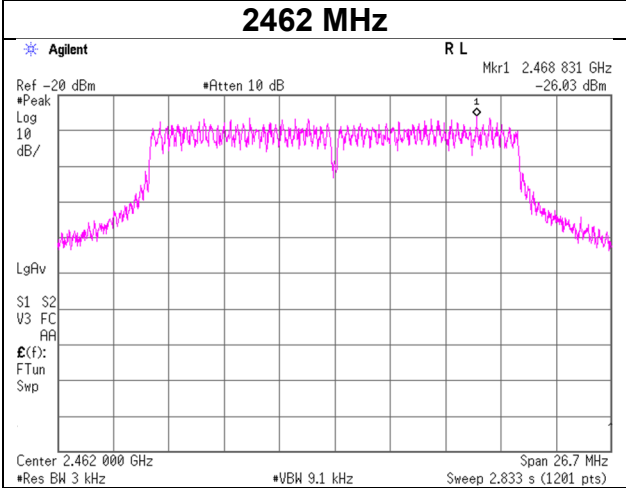
11n-20
2412 MHz



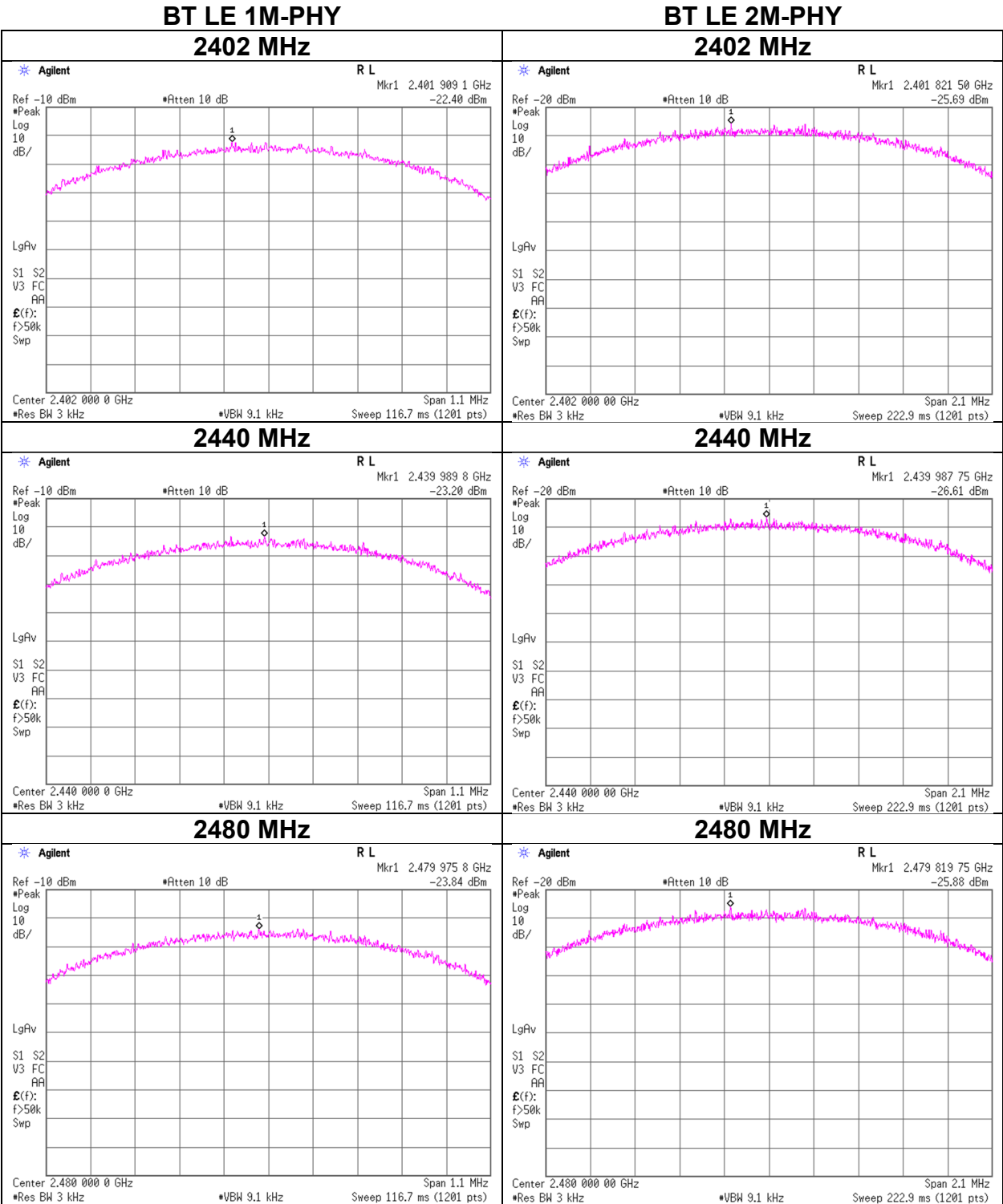
2437 MHz



2462 MHz



Power Density



APPENDIX 2: Test Instruments

Test Equipment

Test Item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
AT	143643	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY52490024	2023/06/21	12
AT	143023	10dB Fixed Atten.	Weinschel - API Technologies Corp	54A-10	56251	2024/05/12	12
AT	143110	Micro Wave Cable	Suhner	SUCOFLEX102	MY3773/2	2024/05/12	12
AT	143588	Peak Power Analyzer	Keysight Technologies Inc	8990B	MY51000276	2023/06/20	12
AT	143606	Power Sensor	Keysight Technologies Inc	N1923A	MY54070024	2023/06/20	12
AT	222747	Measure	SHINWA RULES CO., LTD.	80862	none	-	-
AT	144210	Digital Multimeter	Fluke Corporation	112	89790193	2023/10/24	12
AT	200034	Temperature & Humidity Logger	HIOKI E.E. CORPORATION	LR5001/LR9504	200636456/200699552	2023/07/18	12
AT	143133	Barometer	Sanoh Co., Ltd	SBR-151	001439	2023/03/10	36
RE	143121	LOGBICON	Schwarzbeck Mess-Elektronik OHG	VULB 9168	343	2024/04/22	12
RE	178806	5dB Fixed Atten.	Pasternack Enterprises	PE7047-5	none	2024/04/17	12
RE	143165	10 Site RE 3m System	UL Japan	none	none	2023/08/01	12
RE	183880	Pre-Amplifier	UL Japan	ZKL-2	001	2024/04/22	12
RE	144199	Test Receiver	Keysight Technologies Inc	N9038A	MY53290016	2023/07/05	12
RE	144632	Semi Anechoic Chamber	TDK	NSA (No.10)	10	2024/05/02	12
RE	143456	Double Ridged Wave Guide	ETS-Lindgren (Cedar Park, Texas)	3115	00204573	2024/02/09	12
RE	192241	Microwave Cable	Huber+Suhner	SF104/PC35m/PC35m/1000mm	805411/4	2024/01/19	12
RE	231901	Micro Wave Cable	Junkosha	MWX221	FEB-20-23-020	2024/03/02	12
RE	175395	Pre Amplifier	Erzia Technologies S.L.	ERZ-LNA-0100-2700-45-4	16A2001702002	2023/12/07	12
RE	143023	10dB Fixed Atten.	Weinschel - API Technologies Corp	54A-10	56251	2024/05/12	12
RE	143459	HPF	Micro-Tronics	HPM50111-02	G015	2024/03/02	12
RE	143642	Spectrum Analyzer	Keysight Technologies Inc	N9030A	MY53310670 Version A.13.12	2024/05/23	12
RE	143643	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY52490024	2023/06/21	12
RE	144644	Semi Anechoic Chamber	TDK	SVSWR (No.11)	11	2024/05/01	12
RE	143455	Double Ridged Wave Guide	ETS-Lindgren (Cedar Park, Texas)	3115	00204569	2024/02/09	12
RE	143140	Micro Wave Cable	Junkosha	MWX221	1407S222	2023/11/17	12
RE	192243	Microwave Cable	Huber+Suhner	SF104/11N/11PC35/8000MM	808995/4	2024/01/19	12
RE	142940	Pre-Amplifier	Micro Wave Factory	MPR-1G26.5-35	161399	2023/06/08	12
RE	235556	10dB Fixed Attenuator	Weinschel Associates	WA54-10-1314	0H3E9	2023/06/13	12
RE	144633	Semi Anechoic Chamber	TDK	SVSWR (No.10)	10	2024/05/07	12
RE	143442	HPF	Micro-Tronics	HPM50111-02	009	2024/06/05	12
RE	143438	Double Ridged Horn	ETS-Lindgren (Cedar Park, Texas)	3160-09	00166043	2023/06/19	12
RE	142937	Pre-Amplifier	TOYO	HAP18-26W	00000035	2023/06/19	12

RE	142992	Micro Wave Cable	Suhner	SUCOFLEX102	MY010/2A	2023/06/04	12
RE	222745	Measure	SHINWA RULES CO., LTD.	80862	none	-	-
RE	143542	Temperature & Humidity Indicator	HIOKI E.E. CORPORATION	3641/9680-50	090999895/090905406	2023/06/27	12
RE	143133	Barometer	Sanoh Co., Ltd	SBR-151	001439	2023/03/10	36
RE	144216	Digital Multimeter	Fluke Corporation	115	994460954	2023/10/24	12
RE	178804	EMI Software	TSJ (Techno Science Japan)	TEPTO-DV3(RE,CE,ME,P E)	Ver 3.1.0546	-	-
RE	222746	Measure	SHINWA RULES CO., LTD.	80862	none	-	-
RE	200033	Temperature & Humidity Logger	HIOKI E.E. CORPORATION	LR5001/LR9504	200636447/200699543	2023/07/18	12
RE	144215	Digital Multimeter	Fluke Corporation	FLK-83-V	14610320	2023/10/24	12

*Hyphens for Last Calibration Date and Cal Int (month) are instruments that Calibration is not required (e.g. software), or instruments checked in advance before use.

The expiration date of the calibration is the end of the expired month.

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

All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.

Test item:

AT: Antenna Terminal Conducted test

RE: Radiated Emission