



RADIO TEST REPORT

Test Report No. : 32EE0075-HO-E-R1

Applicant : NEC Corporation of America
Type of Equipment : Digital Portable Cellular Telephone
Model No. : KMP7N4AC1-3A
FCC ID : A98-QOE9653
Test regulation : FCC Part 15 Subpart C: 2011
Test Result : Complied

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.
6. This report is a revised version of 32EE0075-HO-E. 32EE0075-HO-E is replaced with this report.

Date of test: December 17 to 23, 2011

Representative test engineer:

Yutaka Yoshida
Engineer of WiSE Japan,
UL Verification Service

Approved by:

Takahiro Hatakeda
Leader of WiSE Japan,
UL Verification Service



NVLAP LAB CODE: 200572-0

This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.
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<http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap>

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SECTION 1: Customer information

Company Name	: NEC Corporation of America
Address	: Radio Communications Systems Division 6535N. State Highway 161, Irving, TX 75039-2402 USA
Telephone Number	: +1 214 262 4241
Facsimile Number	: +1 214 262 4225
Contact Person	: Sanjay Wadhwa

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

2.1 Identification of E.U.T.

Type of Equipment	: Digital Portable Cellular Telephone
Model No.	: KMP7N4AC1-3A
Serial No.	: Refer to Section 4, Clause 4.2
Rating	: DC 3.8V
Receipt Date of Sample	: December 15, 2011
Country of Mass-production	: Japan
Condition of EUT	: Production prototype
Modification of EUT	: No Modification by the test lab

2.2 Product description

Model No: KMP7N4AC1-3A, (referred to as the EUT in this report), is the Digital Portable Cellular Telephone.

Radio Specification [1/2]

Bluetooth (Ver.2.1 + EDR)

Equipment Type	Transceiver
Frequency of Operation	2402-2480MHz
Other Clock Frequency	19.2MHz
Type of Modulation	FHSS
Bandwidth & Channel spacing	1MHz & 1MHz
Antenna Connector Type	Integrated antenna

Low Energy (Ver.4.0)

Equipment Type	Transceiver
Frequency of Operation	2402-2480MHz
Other Clock Frequency	19.2MHz
Bandwidth & Channel spacing	1MHz & 2MHz
Antenna Connector Type	Integrated antenna

WLAN (IEEE802.11b/g/n (SISO/HT20))

Equipment Type	Transceiver
Frequency of Operation	2412-2462MHz
Other Clock Frequency	19.2MHz
Type of Modulation	DSSS, OFDM
Antenna Connector Type	Integrated antenna

GSM

Equipment Type	Transceiver
Frequency of Operation	[Up Link] GSM850: 824 – 849MHz PCS: 1850 – 1910MHz [Down Link] GSM850: 869 – 894MHz PCS: 1930 – 1990MHz
Other Clock Frequency	19.2MHz
Type of Modulation	GMSK
Channel spacing	200kHz
Antenna Connector Type	Integrated antenna

Radio Specification [2/2]

WCDMA

Equipment Type	Transceiver
Frequency of Operation	[Up Link] Band V: 824 – 849MHz [Down Link] Band V: 869 – 894MHz
Other Clock Frequency	19.2MHz
Type of Modulation	HPSK
Channel spacing	5MHz
Antenna Connector Type	Integrated antenna

GPS

Equipment Type	Receiver
Receiver Type	Direct Downconversion
Frequency of Operation	1575.42MHz
Other Clock Frequency	19.2MHz
Antenna Connector Type	Integrated antenna

RFID

Equipment Type	Transceiver
Frequency of Operation	13.56MHz
Type of Modulation	ASK
Antenna Connector Type	Integrated antenna

*This test report applies for Low Energy (Ver.4.0).

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C: 2011, final revised on November 21, 2011 and effective December 21, 2011

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

*The revision on November 21, 2011 does not affect the test specification applied to the EUT.

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.4:2003 7. AC powerline Conducted Emission measurements IC: RSS-Gen 7.2.4	FCC: Section 15.207 IC: RSS-Gen 7.2.4	QP 31.5dB, 1.64513MHz, L AV 29.9dB, 0.21962MHz, N	Complied	-
6dB Bandwidth	FCC: "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247" IC: RSS-Gen 4.6.2	FCC: Section 15.247(a)(2) IC: RSS-210 A8.2(a)	See data.	Complied	Conducted
Maximum Peak Output Power	FCC: "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247" IC: RSS-Gen 4.8	FCC: Section 15.247(b)(3) IC: RSS-210 A8.4(4)		Complied	Conducted
Power Density	FCC: "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247" IC: -	FCC: Section 15.247 (e) IC: RSS-210 A8.2(b)		Complied	Conducted
Spurious Emission Restricted Band Edges	FCC: "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247" IC: RSS-Gen 4.9	FCC: Section15.247(d) IC: RSS-210 A8.5 RSS-Gen 7.2.3	10.7dB 9920.000MHz, AV, Vert./Hori. 24800.000MHz, AV, Vert./Hori.	Complied	Conducted/ Radiated

Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.

* In case any questions arise about test procedure, ANSI C63.4: 2003 is also referred.

FCC 15.31 (e)

This EUT provides stable voltage (DC1.3, 1.8V) constantly to RF Part regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

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

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% Occupied Bandwidth	IC: RSS-Gen 4.6.1	IC: RSS-Gen 4.6.1	N/A	-	Conducted

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

3.4 Uncertainty

EMI

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

Test room (semi-anechoic chamber)	Conducted emission (+dB)
	150kHz-30MHz
No.1	3.5dB
No.2	3.6dB
No.3	3.6dB
No.4	3.6dB

Test room (semi-anechoic chamber)	Radiated emission						
	(3m*)(+dB)				(1m*)(+dB)		(0.5m*)(+dB)
	9kHz -30MHz	30MHz -300MHz	300MHz -1GHz	1GHz -18GHz	10GHz -18GHz	18GHz -26.5GHz	26.5GHz -40GHz
No.1	4.2dB	5.0dB	5.1dB	4.7dB	5.7dB	4.4dB	4.3dB
No.2	4.1dB	5.2dB	5.1dB	4.8dB	5.6dB	4.3dB	4.2dB
No.3	4.5dB	5.0dB	5.2dB	4.8dB	5.6dB	4.5dB	4.2dB
No.4	4.7dB	5.2dB	5.2dB	4.8dB	5.6dB	5.1dB	4.2dB

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

Power meter (+dB)	
Below 1GHz	Above 1GHz
1.0dB	1.0dB

Antenna terminal conducted emission and Power density (+dB)			Antenna terminal conducted emission (+dB)		Channel power (+dB)
Below 1GHz	1GHz-3GHz	3GHz-18GHz	18GHz-26.5GHz	26.5GHz-40GHz	
1.0dB	1.1dB	2.7dB	3.2dB	3.3dB	1.5dB

Conducted Emission test

The data listed in this test report has enough margin, more than the site margin.

Radiated emission test (3m)

The data listed in this test report has enough margin, more than the site margin.

3.5 Test Location

UL Japan, Inc. Head Office EMC Lab. *NVLAP Lab. code: 200572-0
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8116 Facsimile : +81 596 24 8124

	FCC Registration Number	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	313583	2973C-1	19.2 x 11.2 x 7.7m	7.0 x 6.0m	No.1 Power source room
No.2 semi-anechoic chamber	655103	2973C-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	2973C-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.3 Preparation room
No.3 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	134570	2973C-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.4 Preparation room
No.4 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 semi-anechoic chamber	-	-	6.0 x 6.0 x 3.9m	6.0 x 6.0m	-
No.6 shielded room	-	-	4.0 x 4.5 x 2.7m	4.75 x 5.4 m	-
No.6 measurement room	-	-	4.75 x 5.4 x 3.0m	4.75 x 4.15 m	-
No.7 shielded room	-	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.8 measurement room	-	-	3.1 x 5.0 x 2.7m	N/A	-
No.9 measurement room	-	-	8.0 x 4.5 x 2.8m	2.0 x 2.0m	-
No.10 measurement room	-	-	2.6 x 2.8 x 2.5m	2.4 x 2.4m	-
No.11 measurement room	-	-	3.1 x 3.4 x 3.0m	2.4 x 3.4m	-

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

3.6 Data of EMI, Test instruments, and Test set up

Refer to APPENDIX.

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

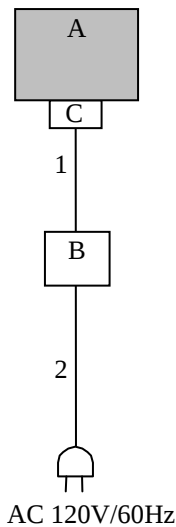
4.1 Operating Mode(s)

Bluetooth (BT): Transmitting (Tx)

Details of Operating Mode(s)

Test Item	Operating Mode	Tested Frequency
Conducted Emission	Tx BT LE	2402MHz
Spurious Emission		2440MHz
6dB Bandwidth		2480MHz
Maximum Peak Output Power		
Power Density		
99% Occupied Bandwidth		

4.2 Configuration and peripherals



* Setup was 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	Remark
A	Digital Portable Cellular Telephone	KMP7N4AC1-3A	004401200840177 *1) 004401200840201 *2)	NEC Corporation of America	EUT
B	AC Adaptor	MAS-BH0008-A002	-	MITSUMI	-
C	Micro USB	FOMA charging microUSB adapter N01	-	NEC Corporation of America	-

*1) Used for Antenna Terminal Conducted test

*2) Used for Conducted Emission and Radiated Emission tests

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	DC Cable	1.6	Shielded	Shielded	-
2	AC Cable	1.2	Unshielded	Unshielded	-

UL Japan, Inc.

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SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a urethane platform of nominal size, 1.0m by 1.5m, raised 0.8m above the conducting ground plane.

The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from a Line Impedance Stabilization Network (LISN)/ Artificial mains Network (AMN) and excess AC cable was bundled in center.

For the tests on EUT with other peripherals (as a whole system)

I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane. All unused 50ohm connectors of the LISN(AMN) were resistivity terminated in 50ohm when not connected to the measuring equipment.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber.

The EUT was connected to a LISN (AMN).

An overview sweep with peak detection has been performed.

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

Detector	: QP and AV
Measurement range	: 0.15-30MHz
Test data	: APPENDIX
Test result	: Pass

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SECTION 6: Radiated Spurious Emission

Test Procedure

It was measured based on "2. Radiated emission test" of "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247".

EUT was placed on a urethane platform of nominal size, 0.5m by 1.0m, raised 0.8m above the conducting ground plane.

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

The height of the measuring antenna varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength.

The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer.

The measurements were made with the following detector function of the test receiver and the Spectrum analyzer (in linear mode).

The test was made with the detector (RBW/VBW) in the following table.

When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

Test Antennas are used as below;

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

Frequency	Below 1GHz	Above 1GHz	
Instrument used	Test Receiver	Spectrum Analyzer	
Detector	QP	PK	AV
IF Bandwidth	BW 120kHz(T/R)	RBW: 1MHz VBW: 3MHz	RBW: 1MHz VBW: 1.6kHz *1)
Test Distance	3m	3m (below 10GHz), 1m*2) (above 10GHz)	

*1) Used for the band edge of the carrier and the harmonics that can be measured. The VBW is based on the inverse of the duty cycle (see Appendix). 1.6kHz was used for LE.

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

- The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

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

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

SECTION 7: Antenna Terminal Conducted Tests

Test Procedure

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

Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument used
6dB Bandwidth	3MHz	100kHz	300kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth	Enough width to display 20dB Bandwidth	1 to 3% of Span	Three times of RBW	Auto	Peak	Max Hold	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak	-	Power Meter (Sensor: 50MHz BW)
Peak Power Density	1.5MHz	3kHz	10kHz	500sec	Peak	Max Hold	Spectrum Analyzer
Conducted Spurious Emission *2)	9kHz to 150kHz	200Hz	1kHz	Auto	Peak	Max Hold	Spectrum Analyzer
	150kHz to 30MHz	9.0kHz	30kHz				
	30MHz to 25GHz (Less or equal to 5GHz)	100kHz	300kHz				
*1) PSD Option 1 of "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247 ". *2) In the frequency range below 30MHz, RBW was narrowed to separate the noise contents. Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart. (9kHz-150kHz:RBW=200Hz, 150kHz-30MHz:RBW=9.0kHz)							

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

Test data : APPENDIX
Test result : Pass

APPENDIX 1: Data of EMI test

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

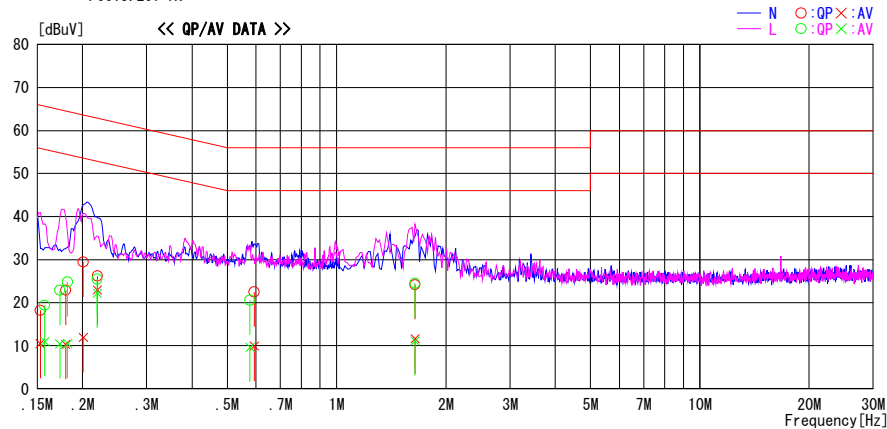
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2011/12/23

Report No. : 32EE0075-H0

Temp./Humi. : 20deg. C / 33% RH
Engineer : Keisuke Kawamura

Mode / Remarks : BT Tx LE 2440MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



Frequency [MHz]	Reading Level		Corr. Factor	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15291	4.9	-2.8	13.3	18.2	10.5	65.8	55.8	47.6	45.3	N	
0.17952	9.6	-3.0	13.3	22.9	10.3	64.5	54.5	41.6	44.2	N	
0.20081	16.1	-1.4	13.3	29.4	11.9	63.6	53.6	34.2	41.7	N	
0.21962	12.9	9.6	13.3	26.2	22.9	62.8	52.8	36.6	29.9	N	
0.59331	9.2	-3.4	13.3	22.5	9.9	56.0	46.0	33.5	36.1	N	
1.64513	10.8	-1.8	13.4	24.2	11.6	56.0	46.0	31.8	34.4	N	
0.15721	6.1	-2.3	13.3	19.4	11.0	65.6	55.6	46.2	44.6	L	
0.17294	9.6	-2.9	13.3	22.9	10.4	64.8	54.8	41.9	44.4	L	
0.18182	11.5	-2.8	13.3	24.8	10.5	64.4	54.4	39.6	43.9	L	
0.21931	12.2	8.9	13.3	25.5	22.2	62.8	52.8	37.3	30.6	L	
0.57811	7.2	-3.7	13.3	20.5	9.6	56.0	46.0	35.5	36.4	L	
1.64513	11.1	-2.3	13.4	24.5	11.1	56.0	46.0	31.5	34.9	L	

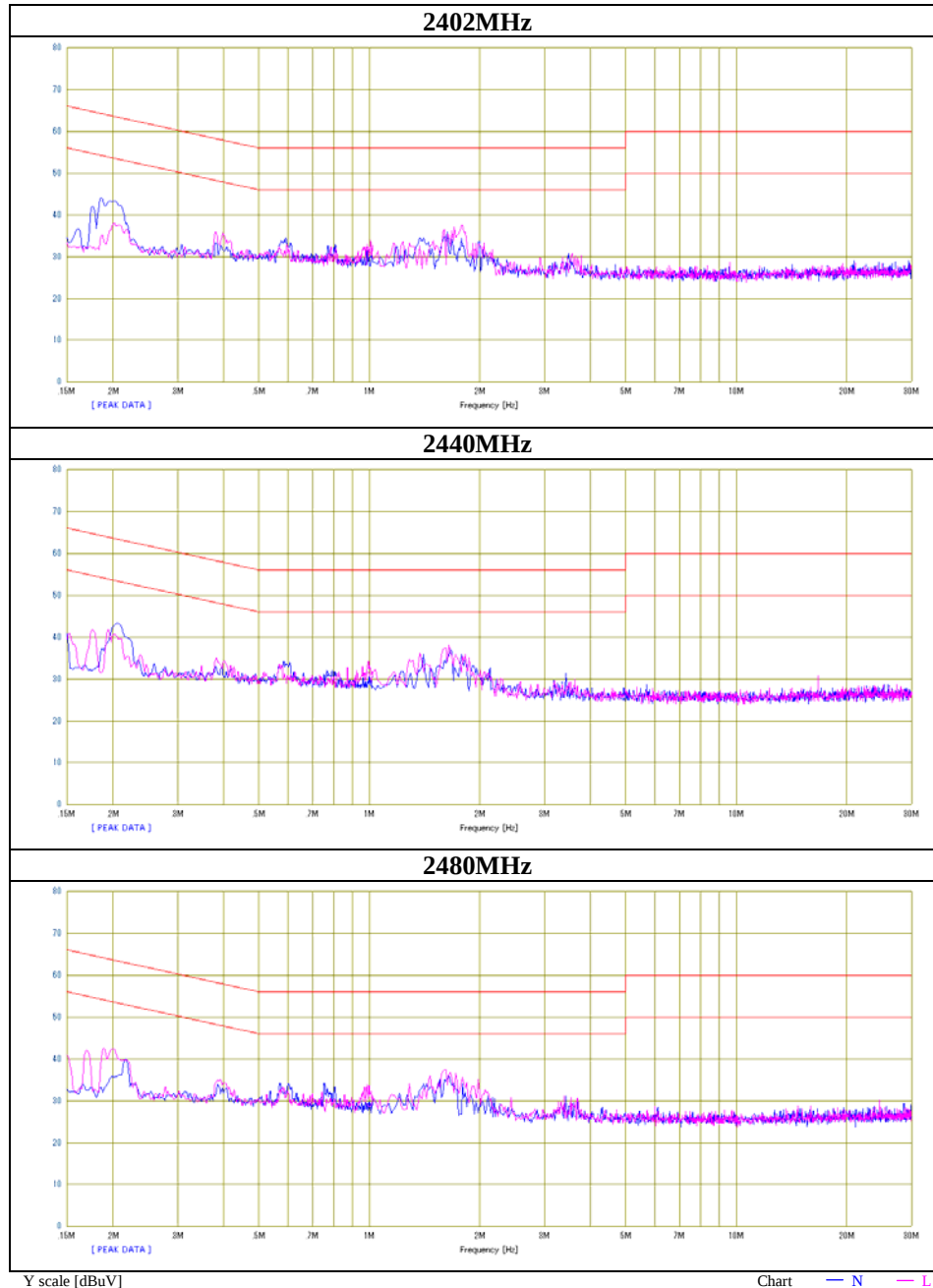
CHART:WITH FACTOR,Peak hold data. CALCULATION:RESULT=READING+C.F(LISN LOSS+ATT LOSS +CABLE LOSS)
Except for the above table : adequate margin data below the limits.

*The limit is rounded down to one decimal place.

*The test result is rounded off to one or two decimal places, so some differences might be observed.

Conducted Emission

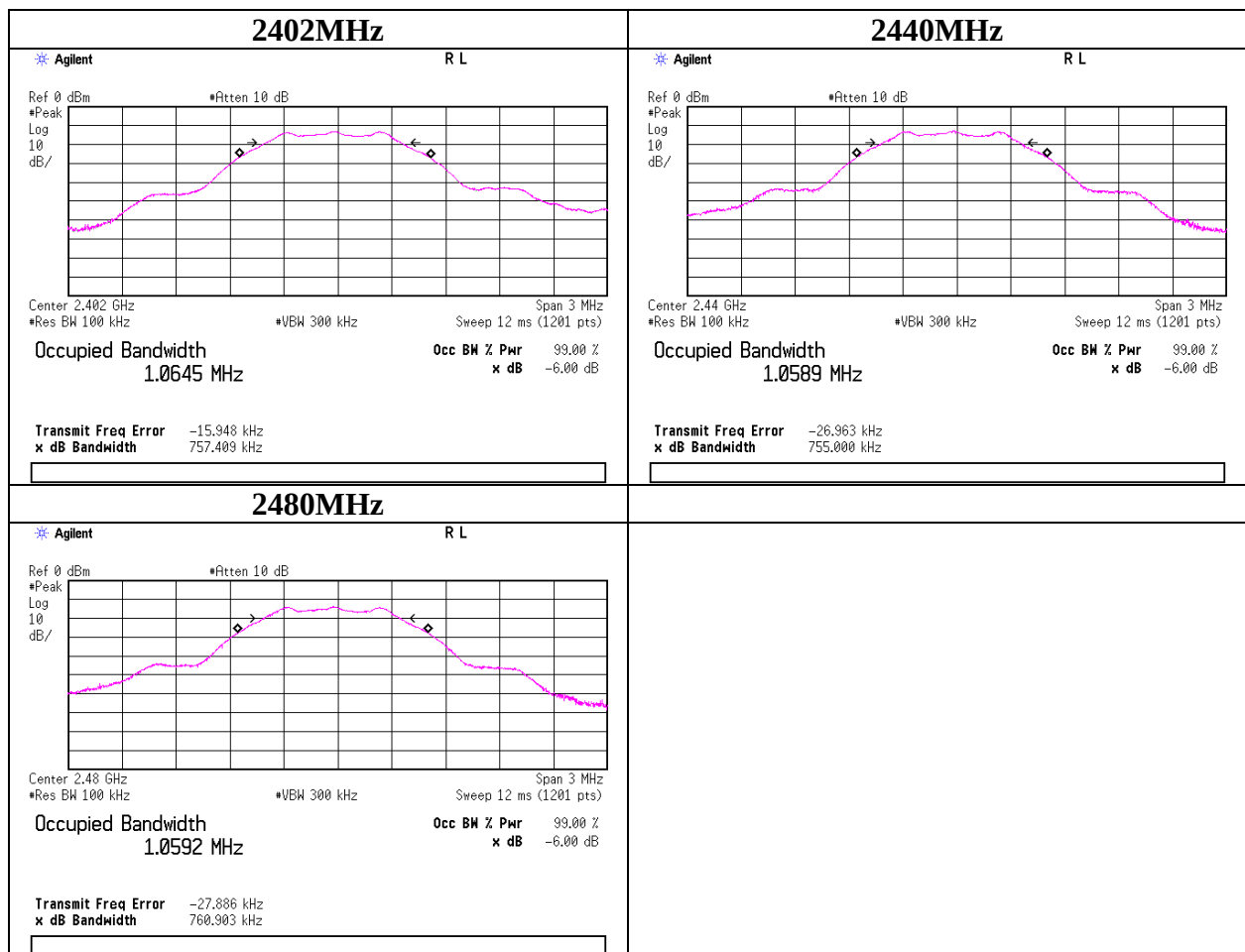
Test place	Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No.	32EE0075-HO
Date	12/23/2011
Temperature/ Humidity	24 deg.C./ 28%
Engineer	Keisuke Kawamura
Mode	Tx Bluetooth Low Energy



6dB Bandwidth

Test place	Head Office EMC Lab. No.6 Shielded Room
Report No.	32EE0075-HO
Date	12/21/2011
Temperature/ Humidity	23deg. C / 32% RH
Engineer	Yutaka Yoshida
Mode	Tx Bluetooth Low Energy

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2402	0.757	>500
2440	0.755	>500
2480	0.761	>500



Maximum Peak Output Power

Test place Head Office EMC Lab. No.6 Shielded Room
Report No. 32EE0075-HO
Date 12/21/2011
Temperature/ Humidity 23deg. C. / 32% RH
Engineer Yutaka Yoshida
daMode Tx Bluetooth Low Energy

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2402	-11.07	2.13	10.07	1.13	1.30	30.00	1000	28.87
2440	-10.75	2.14	10.07	1.46	1.40	30.00	1000	28.54
2480	-11.72	2.14	10.07	0.49	1.12	30.00	1000	29.51

Sample Calculation:

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

Radiated Spurious Emission

Test place Head Office EMC Lab. No.3 and No.4 Semi Anechoic Chamber
Report No. 32EE0075-HO
Date 12/17/2011 12/19/2011
Temperature/ Humidity 20 deg.C/ 33% RH 26 deg.C/ 28% RH
Engineer Katsunori Okai Keisuke Kawamura
Above 1GHz Below 1GHz
Mode LE Tx 2402MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	46.239	QP	23.1	12.3	7.4	32.3	10.5	40.0	29.5	
Hori	57.947	QP	22.8	8.6	7.5	32.2	6.7	40.0	33.3	
Hori	82.212	QP	22.7	6.9	7.8	32.1	5.3	40.0	34.7	
Hori	147.911	QP	22.7	14.9	8.6	32.1	14.1	43.5	29.4	
Hori	641.834	QP	22.5	21.2	11.9	32.2	23.4	46.0	22.6	
Hori	910.172	QP	22.3	24.4	13.3	31.2	28.8	46.0	17.2	
Hori	2390.000	PK	41.9	26.4	2.2	32.6	37.9	73.9	36.0	
Hori	2400.000	PK	50.2	26.4	2.2	32.6	46.2	73.9	27.7	
Hori	4804.000	PK	40.1	30.4	3.9	31.9	42.5	73.9	31.4	
Hori	7206.000	PK	41.1	35.2	4.6	32.4	48.5	73.9	25.4	
Hori	9608.000	PK	40.2	38.1	5.5	32.9	50.9	73.9	23.0	
Hori	24020.000	PK	46.3	38.5	-1.8	31.6	51.4	73.9	22.5	
Hori	2390.000	AV	29.6	26.4	2.2	32.6	25.6	53.9	28.3	
Hori	2400.000	AV	33.4	26.4	2.2	32.6	29.4	53.9	24.5	
Hori	4804.000	AV	29.5	30.4	3.9	31.9	31.9	53.9	22.0	
Hori	7206.000	AV	31.3	35.2	4.6	32.4	38.7	53.9	15.2	
Hori	9608.000	AV	31.1	38.1	5.5	32.9	41.8	53.9	12.1	
Hori	24020.000	AV	35.6	38.5	-1.8	31.6	40.7	53.9	13.2	
Vert	45.751	QP	24.8	12.5	7.3	32.2	12.4	40.0	27.6	
Vert	57.931	QP	26.7	8.6	7.5	32.2	10.6	40.0	29.4	
Vert	83.111	QP	31.0	7.1	7.9	32.1	13.9	40.0	26.1	
Vert	147.111	QP	23.6	14.9	8.6	32.1	15.0	43.5	28.5	
Vert	643.000	QP	22.7	21.2	11.9	32.2	23.6	46.0	22.4	
Vert	909.005	QP	22.3	24.4	13.3	31.2	28.8	46.0	17.2	
Vert	2390.000	PK	42.1	26.4	2.2	32.6	38.1	73.9	35.8	
Vert	2400.000	PK	50.7	26.4	2.2	32.6	46.7	73.9	27.2	
Vert	4804.000	PK	40.3	30.4	3.9	31.9	42.7	73.9	31.2	
Vert	7206.000	PK	41.5	35.2	4.6	32.4	48.9	73.9	25.0	
Vert	9608.000	PK	40.5	38.1	5.5	32.9	51.2	73.9	22.7	
Vert	24020.000	PK	46.4	38.5	-1.8	31.6	51.5	73.9	22.4	
Vert	2390.000	AV	30.3	26.4	2.2	32.6	26.3	53.9	27.6	
Vert	2400.000	AV	33.2	26.4	2.2	32.6	29.2	53.9	24.7	
Vert	4804.000	AV	29.5	30.4	3.9	31.9	31.9	53.9	22.0	
Vert	7206.000	AV	31.3	35.2	4.6	32.4	38.7	53.9	15.2	
Vert	9608.000	AV	31.1	38.1	5.5	32.9	41.8	53.9	12.1	
Vert	24020.000	AV	35.6	38.5	-1.8	31.6	40.7	53.9	13.2	

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

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

*The 10th harmonic was not seen so the result was its base noise level.

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

26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

*For the band edge of the carrier and the harmonics that emission was found, the test was performed with VBW of the average detector set at 1.6kHz.

Radiated Spurious Emission

Test place Head Office EMC Lab. No.3 and No.4 Semi Anechoic Chamber
Report No. 32EE0075-HO
Date 12/17/2011 12/19/2011
Temperature/ Humidity 20 deg.C/ 33% RH 26 deg.C/ 28% RH
Engineer Katsunori Okai Keisuke Kawamura
Above 1GHz Below 1GHz
Mode LE Tx 2440MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	46.239	QP	23.1	12.3	7.4	32.3	10.5	40.0	29.5	
Hori	57.947	QP	22.8	8.6	7.5	32.2	6.7	40.0	33.3	
Hori	82.212	QP	22.7	6.9	7.8	32.1	5.3	40.0	34.7	
Hori	147.911	QP	22.7	14.9	8.6	32.1	14.1	43.5	29.4	
Hori	641.834	QP	22.5	21.2	11.9	32.2	23.4	46.0	22.6	
Hori	910.172	QP	22.3	24.4	13.3	31.2	28.8	46.0	17.2	
Hori	4880.000	PK	40.5	30.5	3.8	31.9	42.9	73.9	31.0	
Hori	7320.000	PK	40.5	35.2	4.6	32.4	47.9	73.9	26.0	
Hori	9760.000	PK	41.3	38.3	5.5	32.9	52.2	73.9	21.7	
Hori	24400.000	PK	45.5	38.8	-1.7	31.4	51.2	73.9	22.7	
Hori	4880.000	AV	29.8	30.5	3.8	31.9	32.2	53.9	21.7	
Hori	7320.000	AV	31.2	35.2	4.6	32.4	38.6	53.9	15.3	
Hori	9760.000	AV	31.1	38.3	5.5	32.9	42.0	53.9	11.9	
Hori	24400.000	AV	35.3	38.8	-1.7	31.4	41.0	53.9	12.9	
Vert	45.751	QP	24.8	12.5	7.3	32.2	12.4	40.0	27.6	
Vert	57.931	QP	26.7	8.6	7.5	32.2	10.6	40.0	29.4	
Vert	83.111	QP	31.0	7.1	7.9	32.1	13.9	40.0	26.1	
Vert	147.111	QP	23.6	14.9	8.6	32.1	15.0	43.5	28.5	
Vert	643.000	QP	22.7	21.2	11.9	32.2	23.6	46.0	22.4	
Vert	909.005	QP	22.3	24.4	13.3	31.2	28.8	46.0	17.2	
Vert	4880.000	PK	40.7	30.5	3.8	31.9	43.1	73.9	30.8	
Vert	7320.000	PK	40.8	35.2	4.6	32.4	48.2	73.9	25.7	
Vert	9760.000	PK	41.6	38.3	5.5	32.9	52.5	73.9	21.4	
Vert	24400.000	PK	45.4	38.8	-1.7	31.4	51.1	73.9	22.8	
Vert	4880.000	AV	29.8	30.5	3.8	31.9	32.2	53.9	21.7	
Vert	7320.000	AV	31.2	35.2	4.6	32.4	38.6	53.9	15.3	
Vert	9760.000	AV	31.1	38.3	5.5	32.9	42.0	53.9	11.9	
Vert	24400.000	AV	35.3	38.8	-1.7	31.4	41.0	53.9	12.9	

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

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

*The 10th harmonic was not seen so the result was its base noise level.

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

*For the band edge of the carrier and the harmonics that emission was found, the test was performed with VBW of the average detector set at 1.6kHz.

Radiated Spurious Emission

Test place : Head Office EMC Lab. No.3 and No.4 Semi Anechoic Chamber
Report No. : 32EE0075-HO
Date : 12/17/2011 12/19/2011
Temperature/ Humidity : 20 deg.C/ 33% RH 26 deg.C/ 28% RH
Engineer : Katsunori Okai Keisuke Kawamura
Above 1GHz Below 1GHz
Mode : LE Tx 2480MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	46.239	QP	23.1	12.3	7.4	32.3	10.5	40.0	29.5	
Hori	57.947	QP	22.8	8.6	7.5	32.2	6.7	40.0	33.3	
Hori	82.212	QP	22.7	6.9	7.8	32.1	5.3	40.0	34.7	
Hori	147.911	QP	22.7	14.9	8.6	32.1	14.1	43.5	29.4	
Hori	641.834	QP	22.5	21.2	11.9	32.2	23.4	46.0	22.6	
Hori	910.172	QP	22.3	24.4	13.3	31.2	28.8	46.0	17.2	
Hori	2483.500	PK	46.7	26.5	2.2	32.6	42.8	73.9	31.1	
Hori	4960.000	PK	40.9	30.6	3.9	31.9	43.5	73.9	30.4	
Hori	7440.000	PK	41.9	35.1	4.7	32.4	49.3	73.9	24.6	
Hori	9920.000	PK	42.0	38.6	5.6	32.9	53.3	73.9	20.6	
Hori	24800.000	PK	47.2	39.0	-1.6	31.2	53.4	73.9	20.5	
Hori	2483.500	AV	32.5	26.5	2.2	32.6	28.6	53.9	25.3	
Hori	4960.000	AV	29.8	30.6	3.9	31.9	32.4	53.9	21.5	
Hori	7440.000	AV	31.4	35.1	4.7	32.4	38.8	53.9	15.1	
Hori	9920.000	AV	31.9	38.6	5.6	32.9	43.2	53.9	10.7	
Hori	24800.000	AV	37.0	39.0	-1.6	31.2	43.2	53.9	10.7	
Vert	45.751	QP	24.8	12.5	7.3	32.2	12.4	40.0	27.6	
Vert	57.931	QP	26.7	8.6	7.5	32.2	10.6	40.0	29.4	
Vert	83.111	QP	31.0	7.1	7.9	32.1	13.9	40.0	26.1	
Vert	147.111	QP	23.6	14.9	8.6	32.1	15.0	43.5	28.5	
Vert	643.000	QP	22.7	21.2	11.9	32.2	23.6	46.0	22.4	
Vert	909.005	QP	22.3	24.4	13.3	31.2	28.8	46.0	17.2	
Vert	2483.500	PK	43.2	26.5	2.2	32.6	39.3	73.9	34.6	
Vert	4960.000	PK	41.1	30.6	3.9	31.9	43.7	73.9	30.2	
Vert	7440.000	PK	42.1	35.1	4.7	32.4	49.5	73.9	24.4	
Vert	9920.000	PK	42.1	38.6	5.6	32.9	53.4	73.9	20.5	
Vert	24800.000	PK	47.4	39.0	-1.6	31.2	53.6	73.9	20.3	
Vert	2483.500	AV	32.1	26.5	2.2	32.6	28.2	53.9	25.7	
Vert	4960.000	AV	29.8	30.6	3.9	31.9	32.4	53.9	21.5	
Vert	7440.000	AV	31.4	35.1	4.7	32.4	38.8	53.9	15.1	
Vert	9920.000	AV	31.9	38.6	5.6	32.9	43.2	53.9	10.7	
Vert	24800.000	AV	37.0	39.0	-1.6	31.2	43.2	53.9	10.7	

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

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

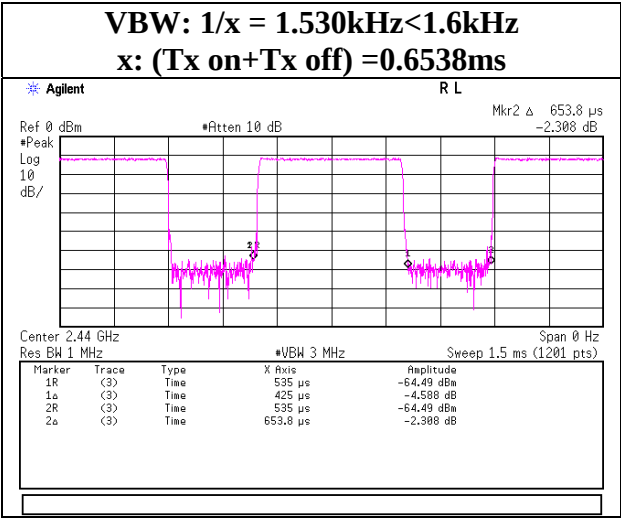
*The 10th harmonic was not seen so the result was its base noise level.

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

26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

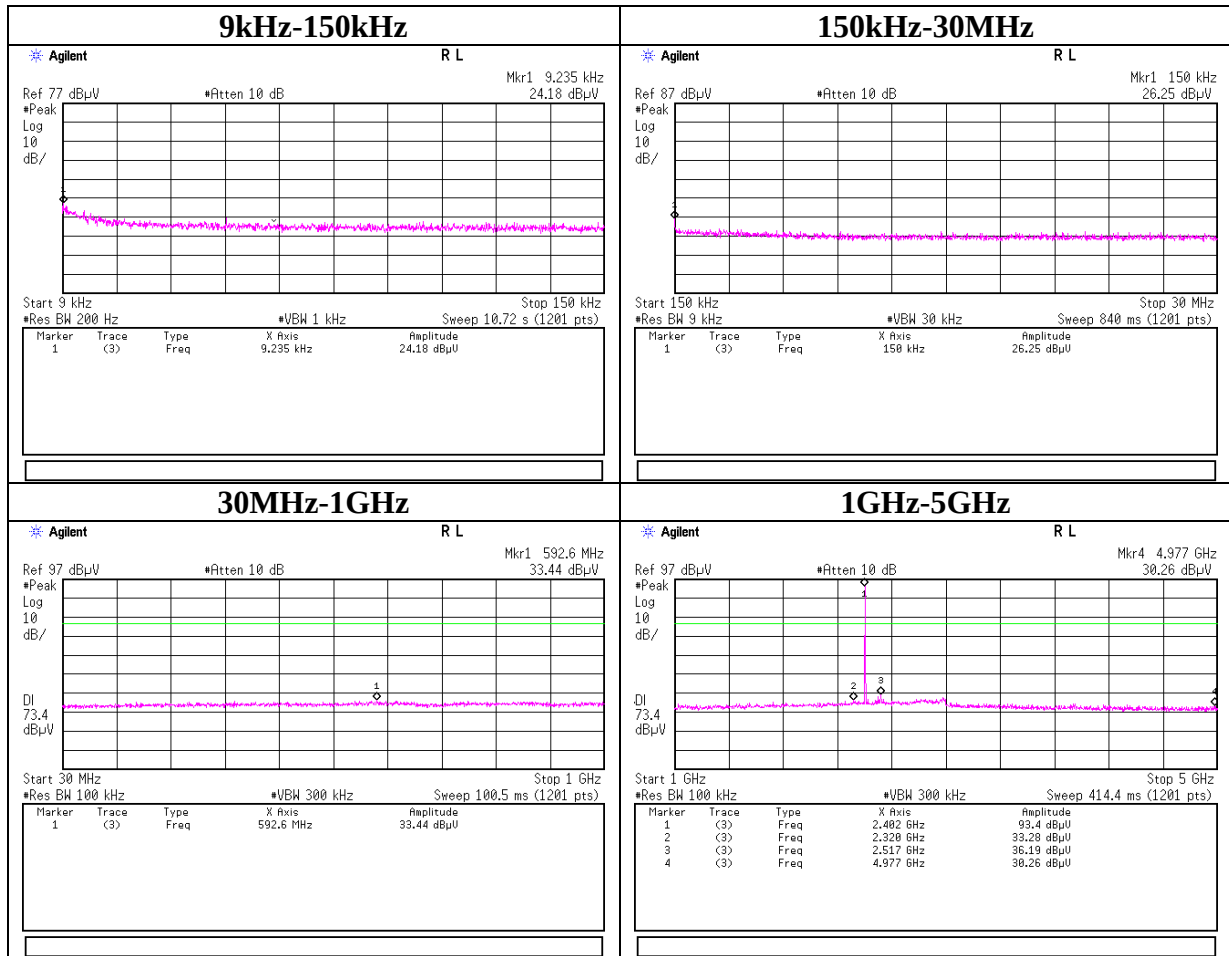
*For the band edge of the carrier and the harmonics that emission was found, the test was performed with VBW of the average detector set at 1.6kHz.

Duty Cycle



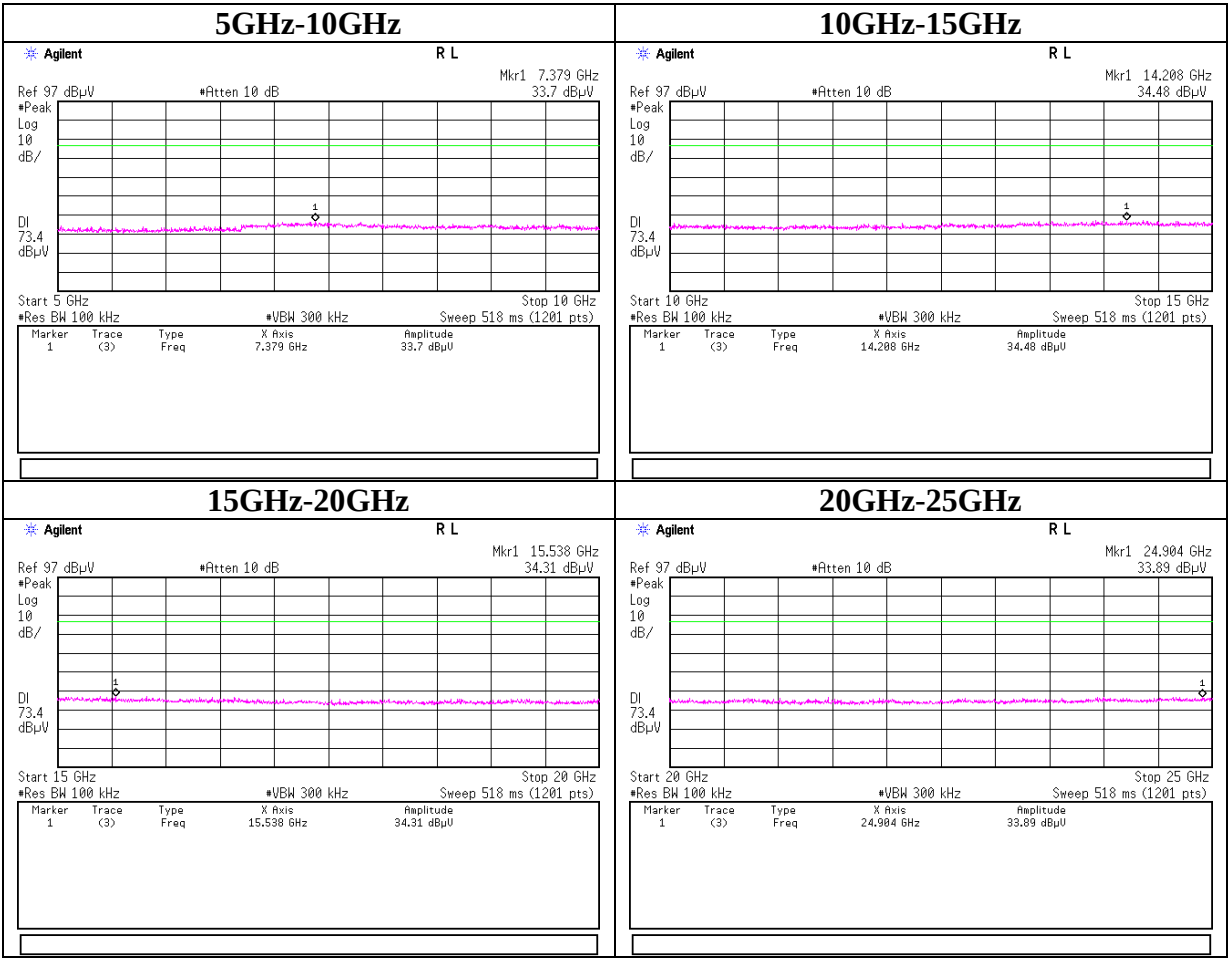
Conducted Spurious Emission

Tx 2402MHz



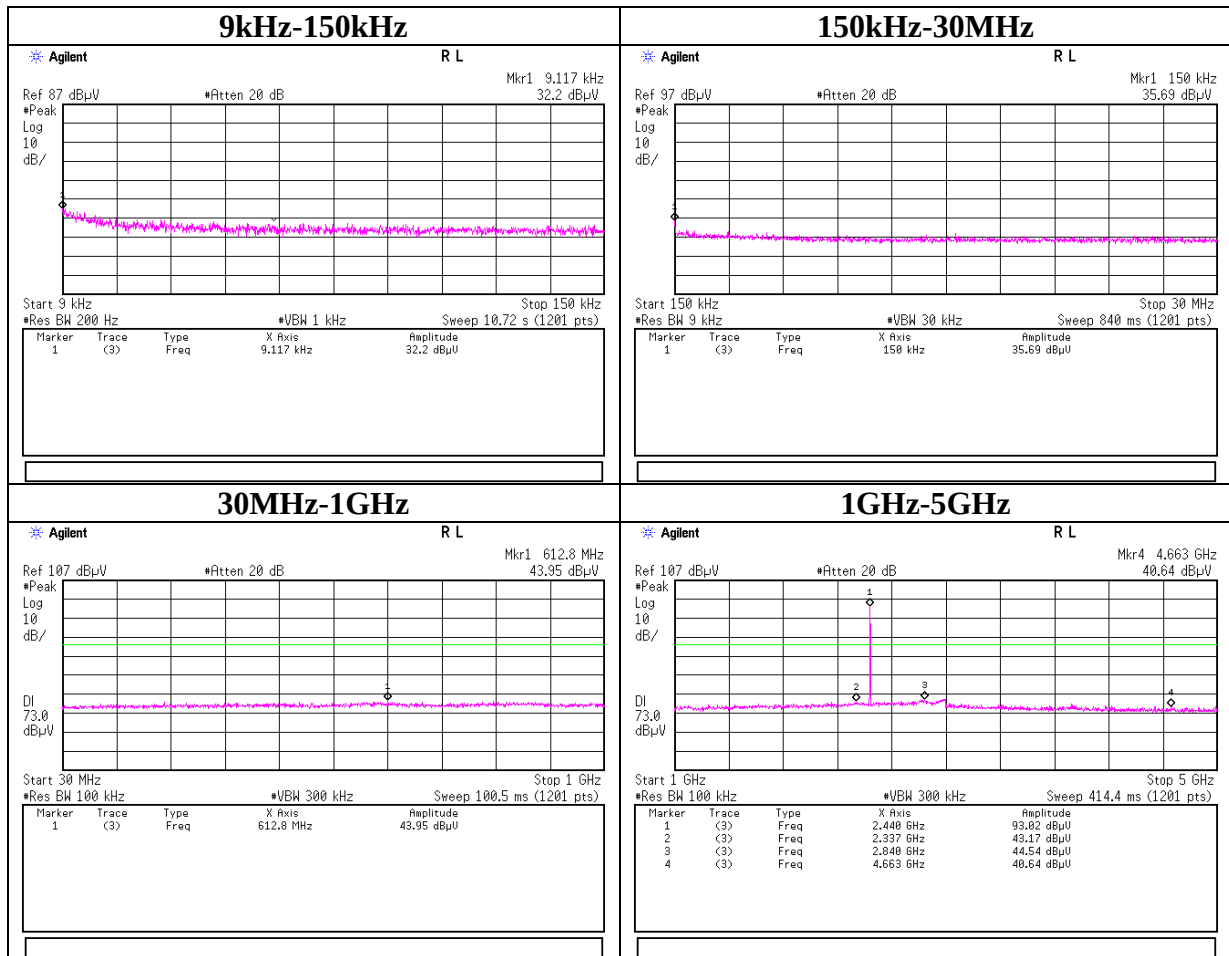
Conducted Spurious Emission

Tx 2402MHz



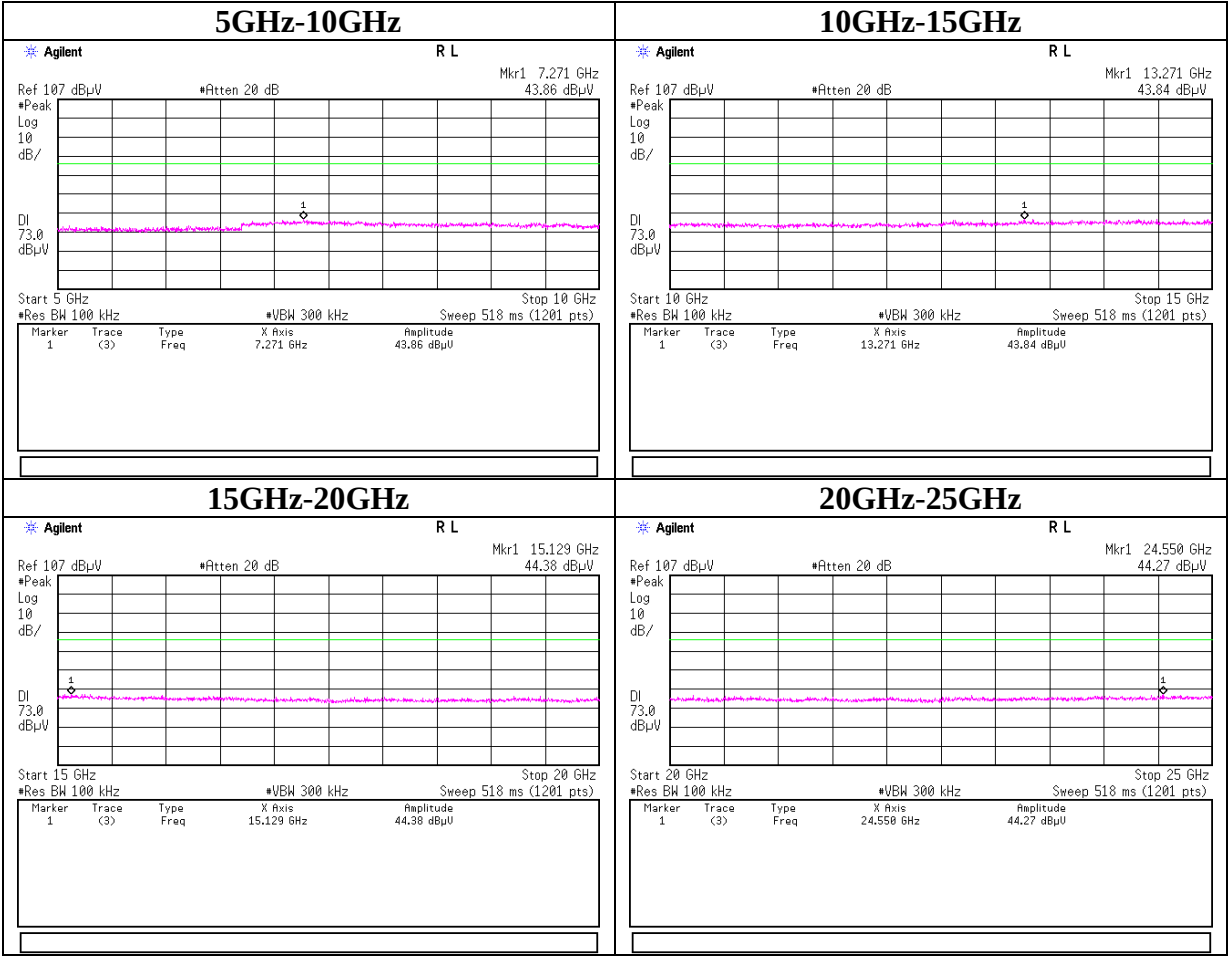
Conducted Spurious Emission

Tx 2440MHz



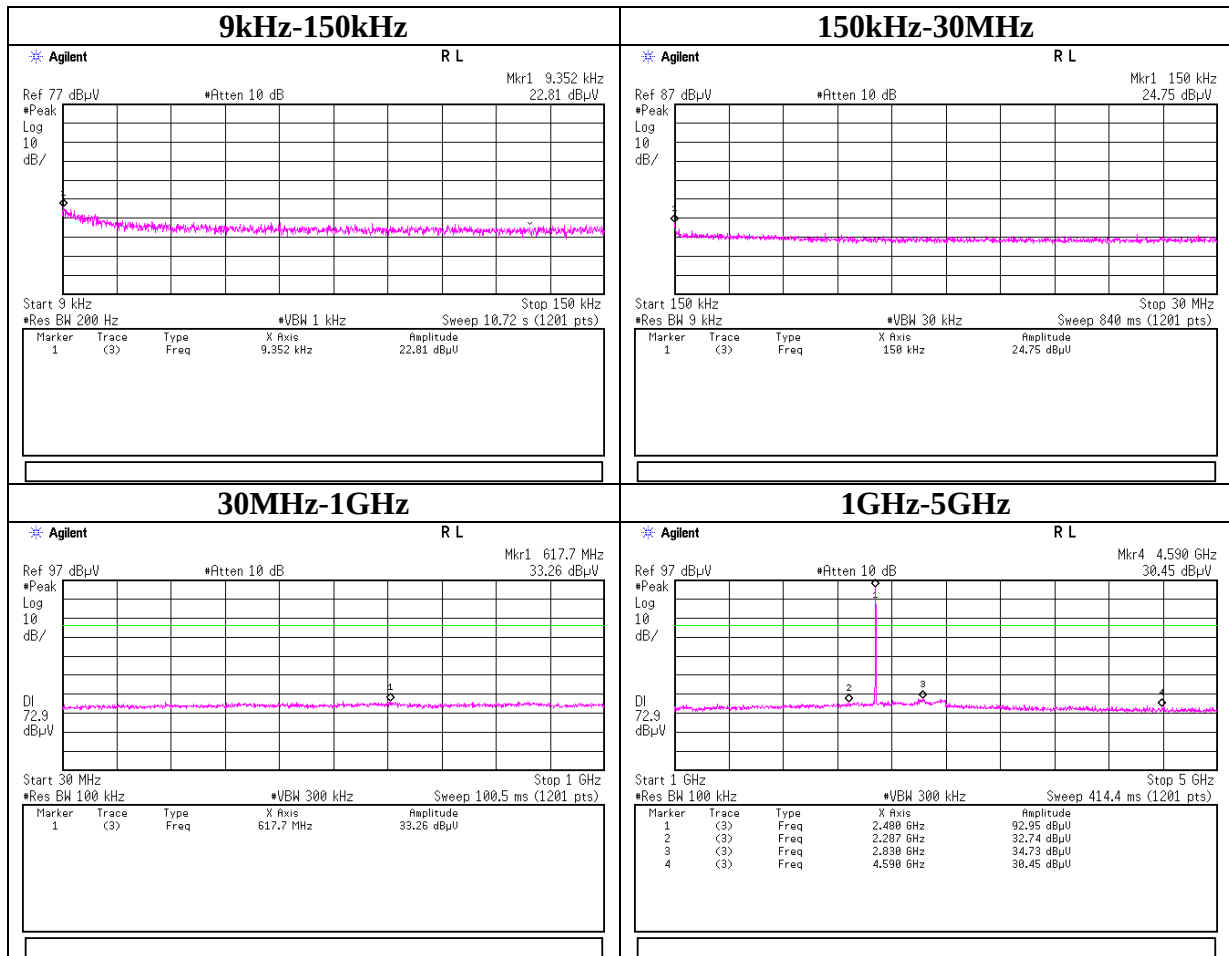
Conducted Spurious Emission

Tx 2440MHz



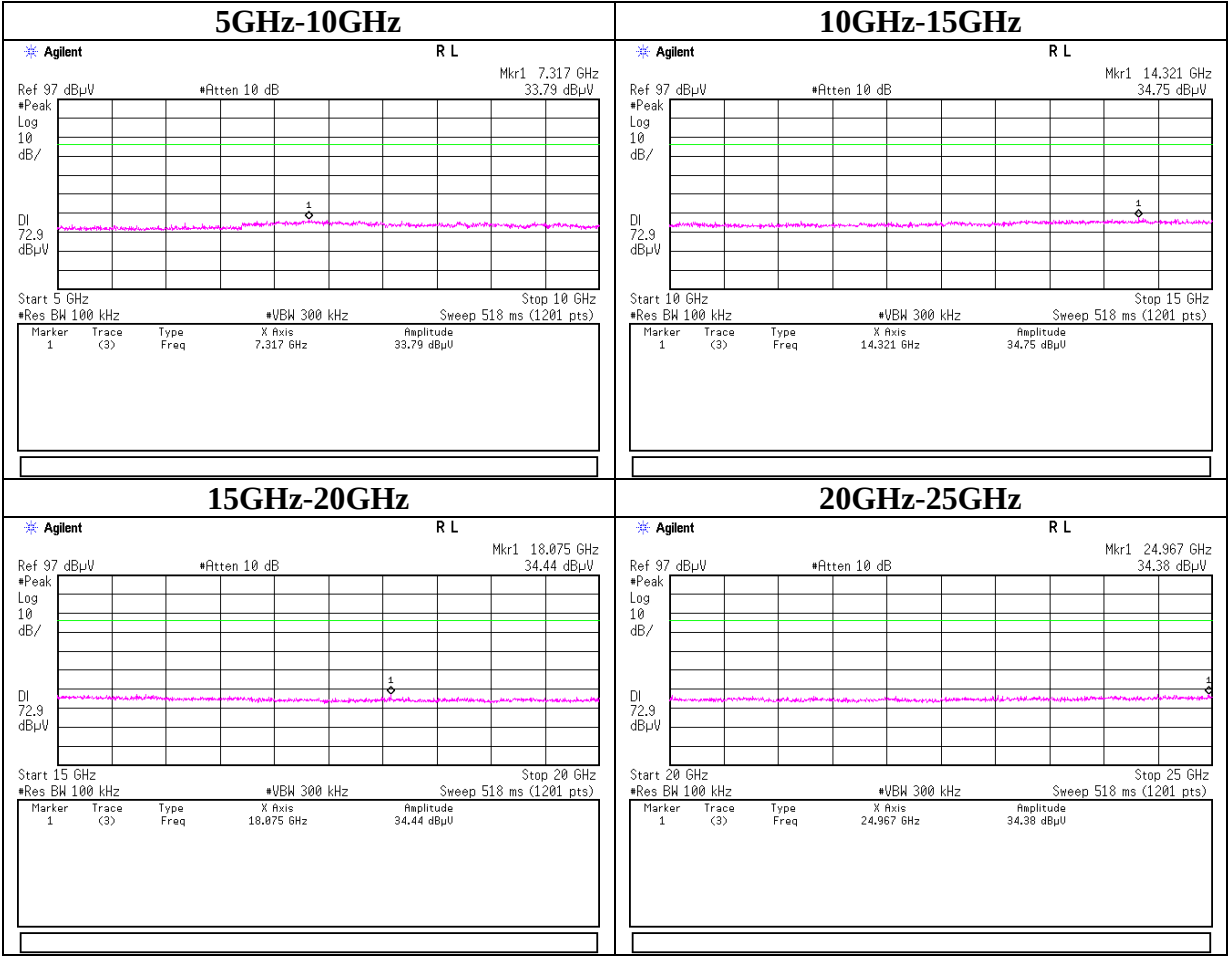
Conducted Spurious Emission

Tx 2480MHz



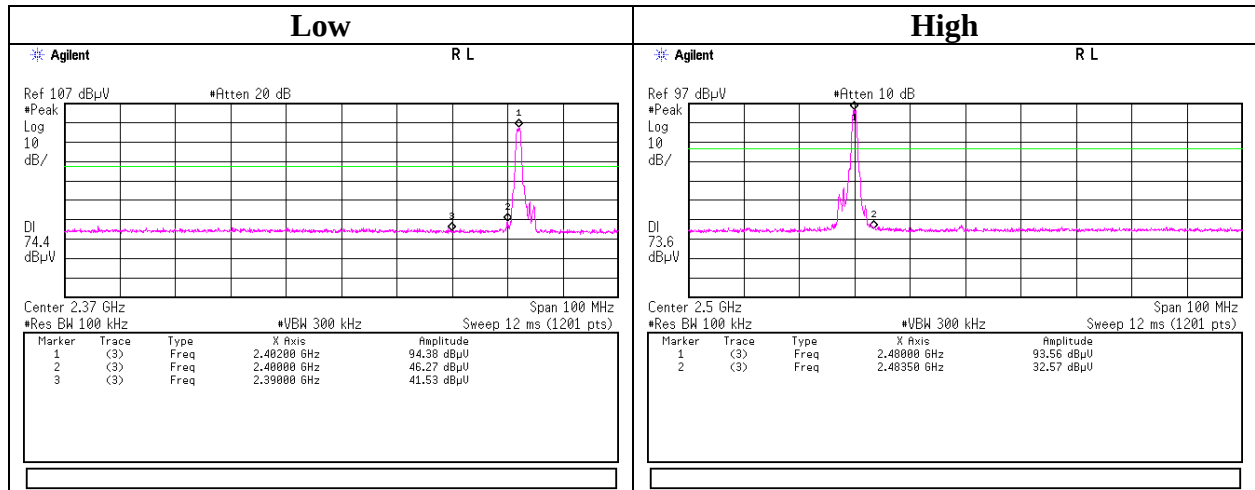
Conducted Spurious Emission

Tx 2480MHz



Conducted Emission Band Edge compliance

Tx



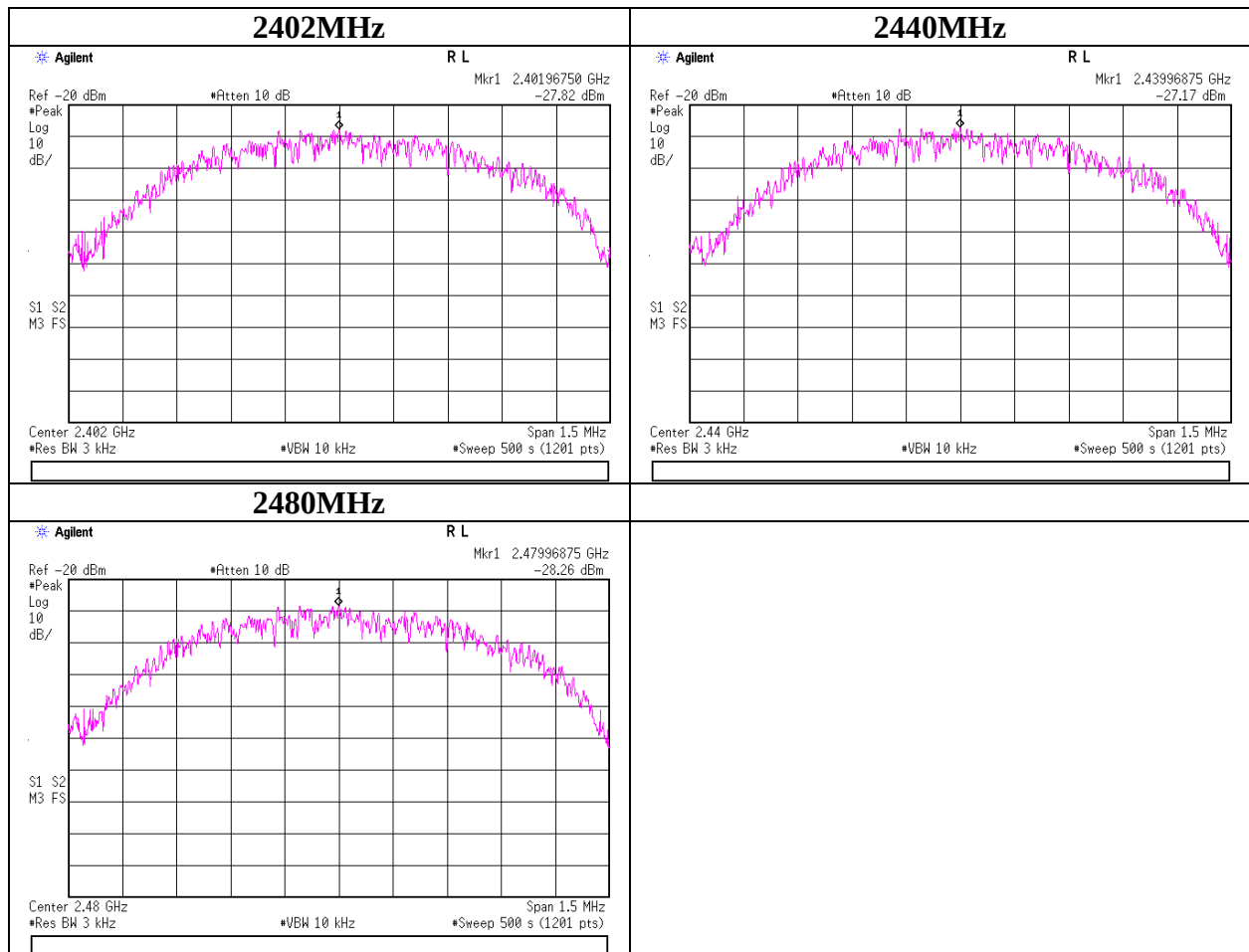
Power Density

Test place Head Office EMC Lab. No.6 Shielded Room
Report No. 32EE0075-HO
Date 12/21/2011
Temperature/ Humidity 23deg. C / 32% RH
Engineer Yutaka Yoshida
Mode Tx Bluetooth Low Energy

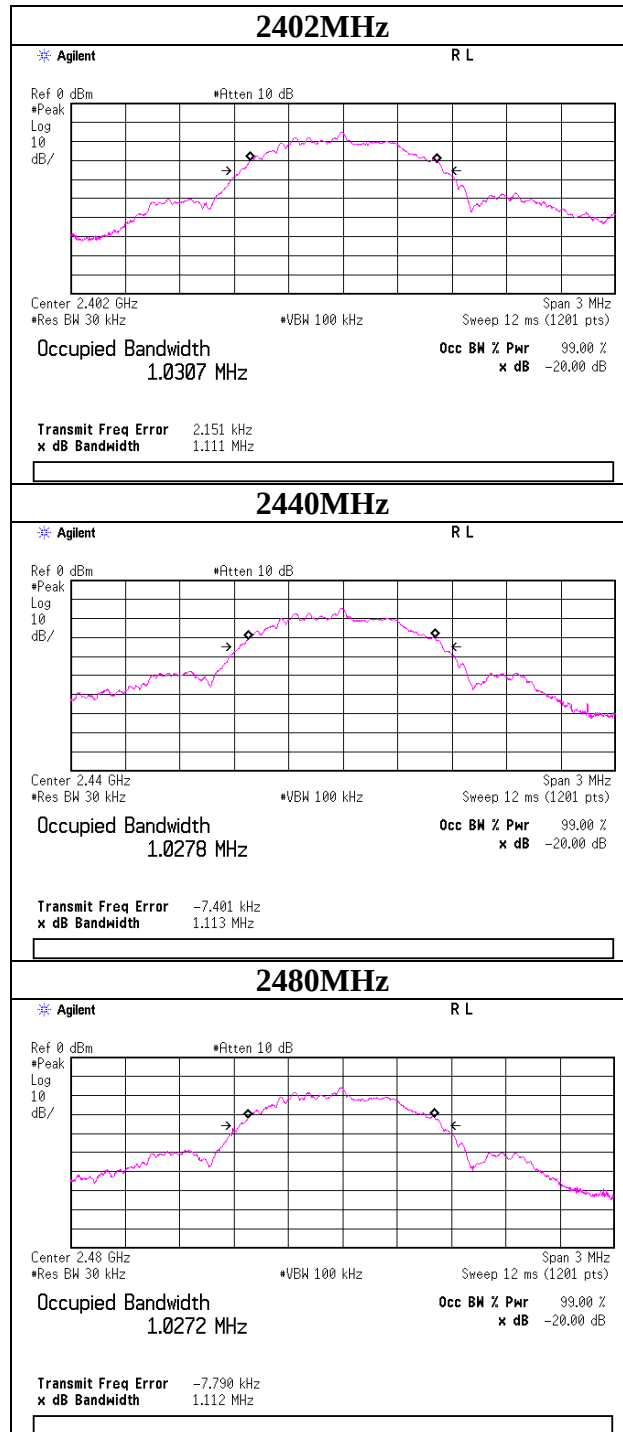
Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2402.00	-27.82	2.13	10.07	-15.62	8.00	23.62
2440.00	-27.17	2.14	10.07	-14.96	8.00	22.96
2480.00	-28.26	2.14	10.07	-16.05	8.00	24.05

Sample Calculation:

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



99% Occupied Bandwidth



APPENDIX 2: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date	Expiration date of the calibration
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2011/02/22	2012/02/29
MOS-13	Thermo-Hygrometer	Custom	CTH-180	-	RE	2011/02/23	2012/02/29
MJM-15	Measure	KOMELON	KMC-36	-	RE	-	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-	-
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	RE/CE	2011/11/23	2012/11/30
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2011/05/23	2012/05/31
MCC-133	Microwave Cable	HUBER+SUHNER	SUCOFLEX104	336164/4(1m) / 340640(5m)	RE	2011/09/07	2012/09/30
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2011/03/10	2012/03/31
MHF-06	High Pass Filter 3.5-24GHz	TOKIMEC	TF323DCA	601	RE	2011/05/16	2012/05/31
MHA-16	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170306	RE	2011/05/23	2012/05/31
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE/CE	2011/03/01	2012/03/31
MOS-15	Thermo-Hygrometer	Custom	CTH-180	-	RE/CE	2011/02/23	2012/02/29
MJM-07	Measure	PROMART	SEN1955	-	RE/CE	-	-
MTR-07	Test Receiver	Rohde & Schwarz	ESCI	100635	RE/CE	2011/10/19	2012/10/31
MBA-05	Biconical Antenna	Schwarzbeck	BBA9106	1302	RE	2011/11/16	2012/11/30
MLA-08	Logperiodic Antenna	Schwarzbeck	UKLP9140-A	N/A	RE	2011/11/16	2012/11/30
MCC-50	Coaxial Cable	UL Japan	-	-	RE	2011/03/25	2012/03/31
MAT-09	Attenuator(6dB)	Weinschel Corp	2	BK7973	RE	2011/11/02	2012/11/30
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	RE	2011/03/04	2012/03/31
MPM-13	Power Meter	Anritsu	ML2495A	0824014	AT	2011/11/07	2012/11/30
MPSE-18	Power sensor	Anritsu	MA2411B	0738174	AT	2011/11/07	2012/11/30
MAT-20	Attenuator(10dB)(above 1GHz)	HIROSE ELECTRIC CO.,LTD.	AT-110	-	AT	2011/01/06	2012/01/31
MCC-138	Microwave cable	HUBER+SUHNER	SUCOFLEX 102	37953/2	AT	2011/10/28	2012/10/31
MSA-06	Spectrum Analyzer	Agilent	E4407B	MY45107638	AT	2011/04/15	2012/04/30
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	8127363	CE(EUT)	2011/02/20	2012/02/29
MAT-67	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2011/02/22	2012/02/29
MCC-113	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W(10m)/SFM141(5m)/421-010(1m)/sucoform141-PE(1m)/RFM-E121(Switcher)	-/04178	CE	2011/07/04	2012/07/31

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: CE: Conducted Emission
RE: Radiated Emission
AT: Antenna Terminal Conducted test

UL Japan, Inc.

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