

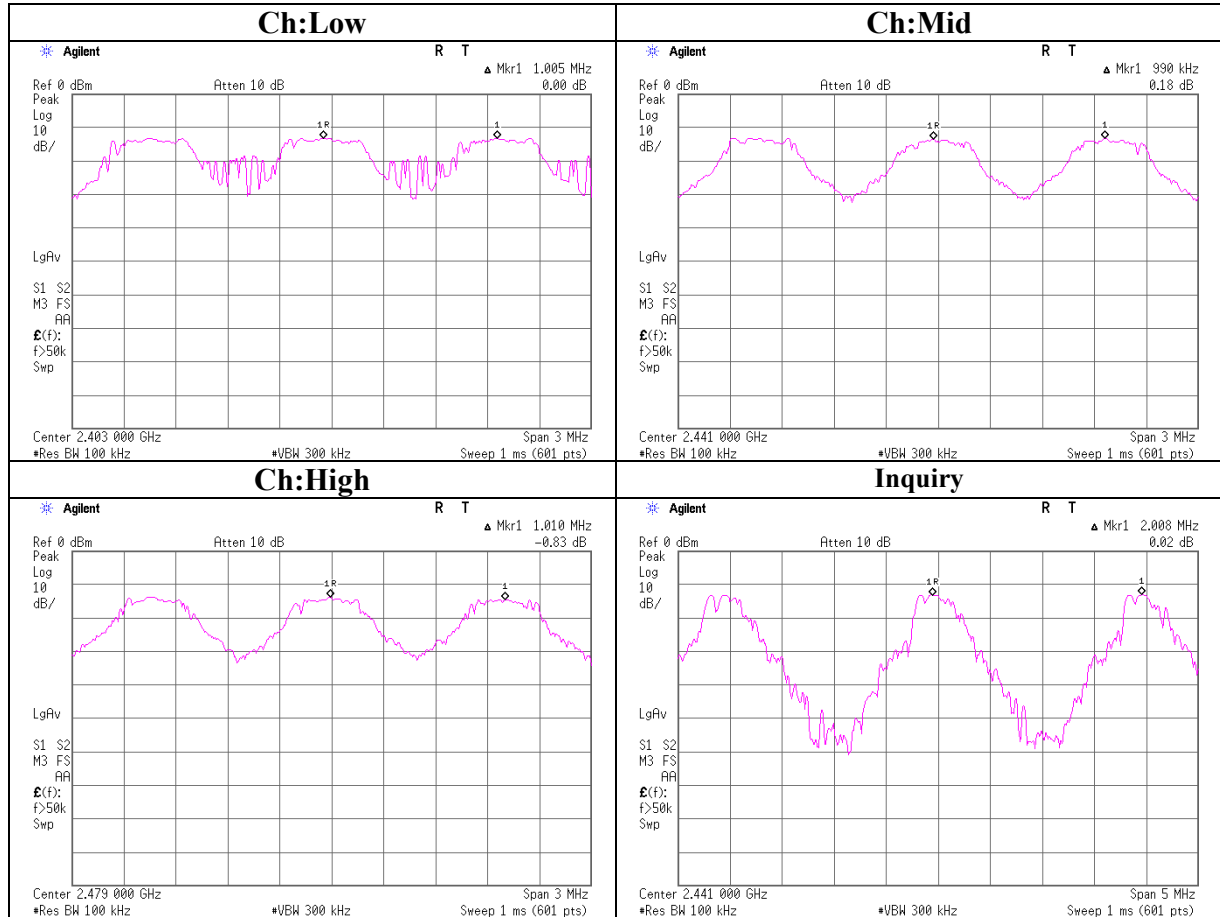
**APPENDIX 2: Data of EMI test**

**Carrier Frequency Separation**

		UL Japan, Inc.
		Head Office EMC Lab. No.2 Measurement Room
Company	: ALPINE ELECTRONICS, INC.	Test Report No. : 28DE0027-HO
Equipment	: Bluetooth Module Board	Regulation : FCC15.247(a)(1)/RSS-210A8.1(b)
Model No.	: UGZZ4-301B	Test distance : -
Serial No.	: 1	Date : 11/30/2007
Power	: DC12V (Module DC3.3V)	Temperature : 24deg.C
Mode	: Tx(Hopping on)/Inquiry	Humidity : 38%
		Engineer : Norihisa Hashimoto

Ch	Freq. [MHz]	Channel separation [MHz]	Limit
Low	2402.0	1.005	>two-thirds of 1.030 [MHz] (20dB Bandwidth) or 25[kHz](whichever is greater)
Mid	2441.0	0.990	>two-thirds of 0.870 [MHz] (20dB Bandwidth) or 25[kHz](whichever is greater)
High	2480.0	1.010	>two-thirds of 0.810 [MHz] (20dB Bandwidth) or 25[kHz](whichever is greater)
Inquiry	2441.0	2.008	>two-thirds of 0.610 [MHz] (20dB Bandwidth) or 25[kHz](whichever is greater)

### Carrier Frequency Separation



Test report No. : 28DE0027-HO-01-A-R1  
Page : 17 of 39  
Issued date : December 10, 2007  
Revised date : January 16, 2008  
FCC ID : A269ZUA127

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## 20dB Bandwidth

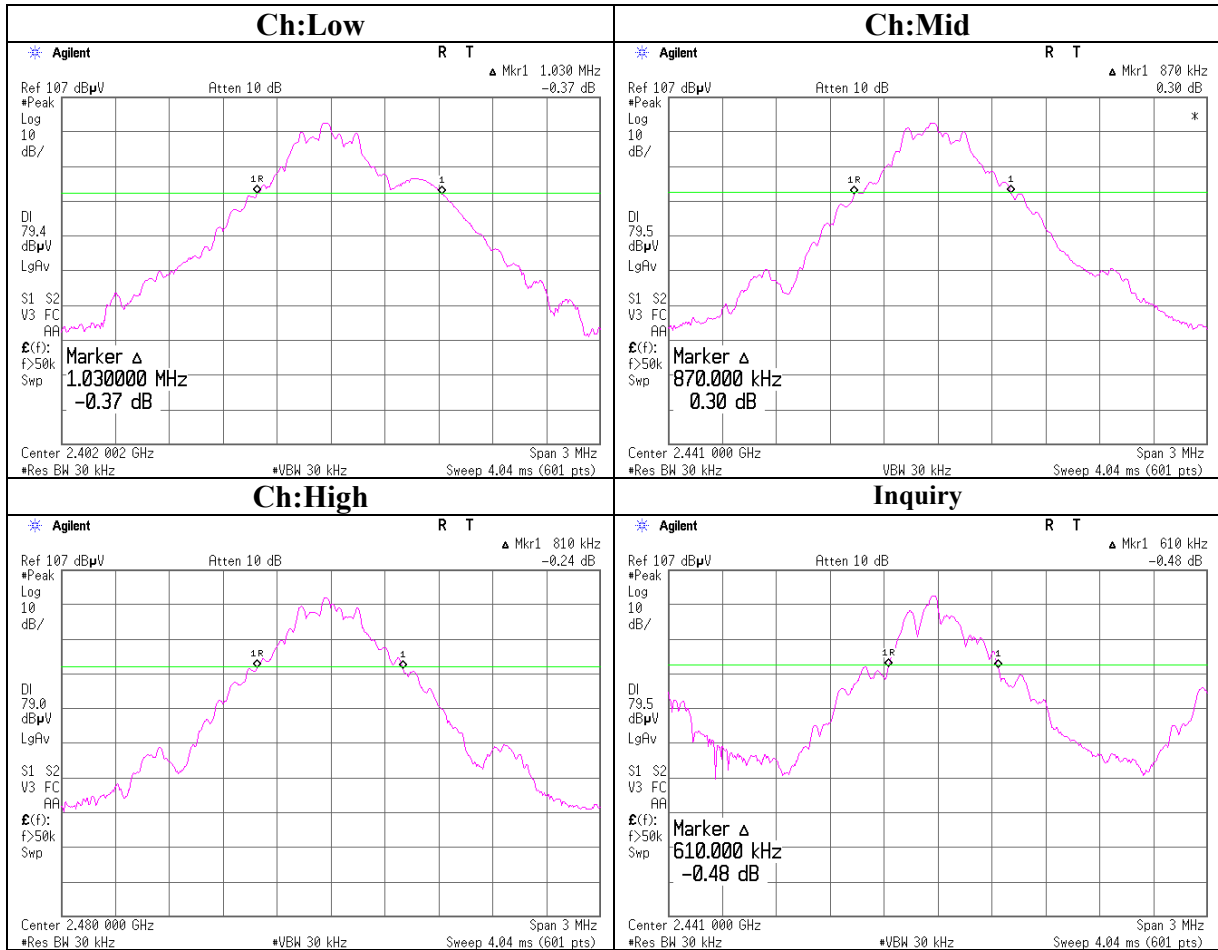
Company	: ALPINE ELECTRONICS, INC.	UL Japan, Inc.	
Equipment	: Bluetooth Module Board	Head Office EMC Lab. No.6 Shielded Room	
Model No.	: UGZZ4-301B	Test Report No.	: 28DE0057-HO
Serial No.	: 001	Regulation	: FCC15.247(a)(1)/RSS-210A8.1(a)
Power	: DC12V (Module DC3.3V)	Test distance	: -
Mode	: Tx (Hopping off) /Inquiry	Date	: 2007/11/27
		Temperature	: 23deg.C
		Humidity	: 41%
		Engineer	: Hisayoshi Sato

Ch	Freq. [MHz]	20dB Bandwidth [MHz]	Limit [MHz]
Low	2402.0	1.030	-
Mid	2441.0	0.870	-
High	2480.0	0.810	-
Inquiry	2441.0	0.610	-

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**UL Japan, Inc.**  
**Head Office EMC Lab.**  
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN  
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### 20dB Bandwidth



### Number of Hopping Frequency

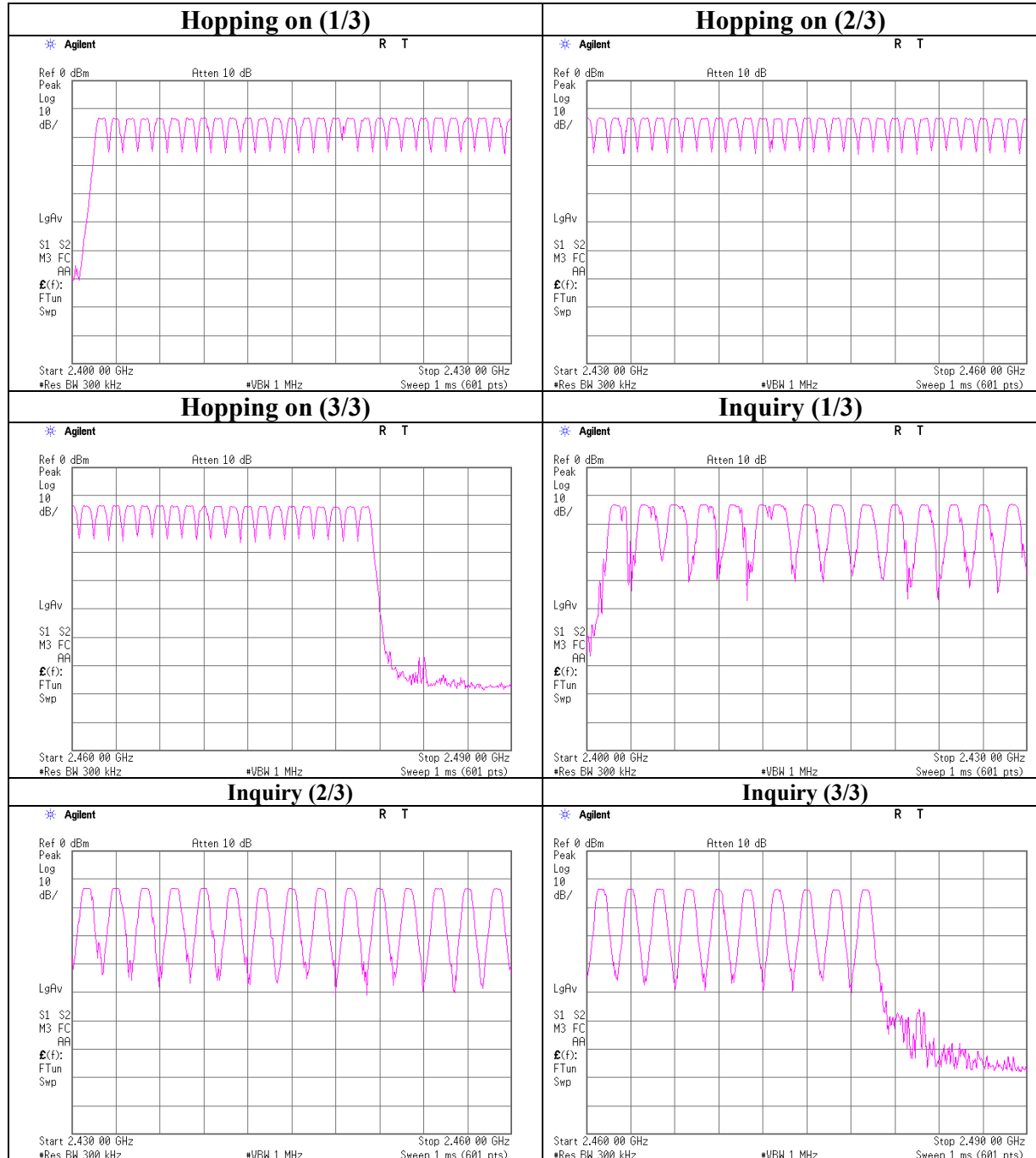
UL Japan, Inc.  
Head Office EMC Lab. No.2 Measurement Room  
Test Report No. : 28DE0027-HO  
Regulation : FCC15.247(a)(1)(iii)/RSS-210A8.1(d)  
Test distance : -  
Date : 11/30/2007  
Temperature : 24deg.C  
Humidity : 38%  
Engineer : Norihisa Hashimoto

Company : ALPINE ELECTRONICS, INC.  
Equipment : Bluetooth Module Board  
Model No. : UGZZ4-301B  
Serial No. : 1  
Power : DC12V (Module DC3.3V)  
Mode : Tx (Hopping on) /Inquiry

Mode	Number of channel	Limit
	[number]	[time]
Tx(Hopping on)	79	$\geq 15$

Mode	Number of channel	Limit
	[number]	[time]
Inquiry	40	$\geq 15$

### Number of Hopping Frequency



### Dwell time

UL Japan, Inc.  
 Head Office EMC Lab. No.2 Measurement Room

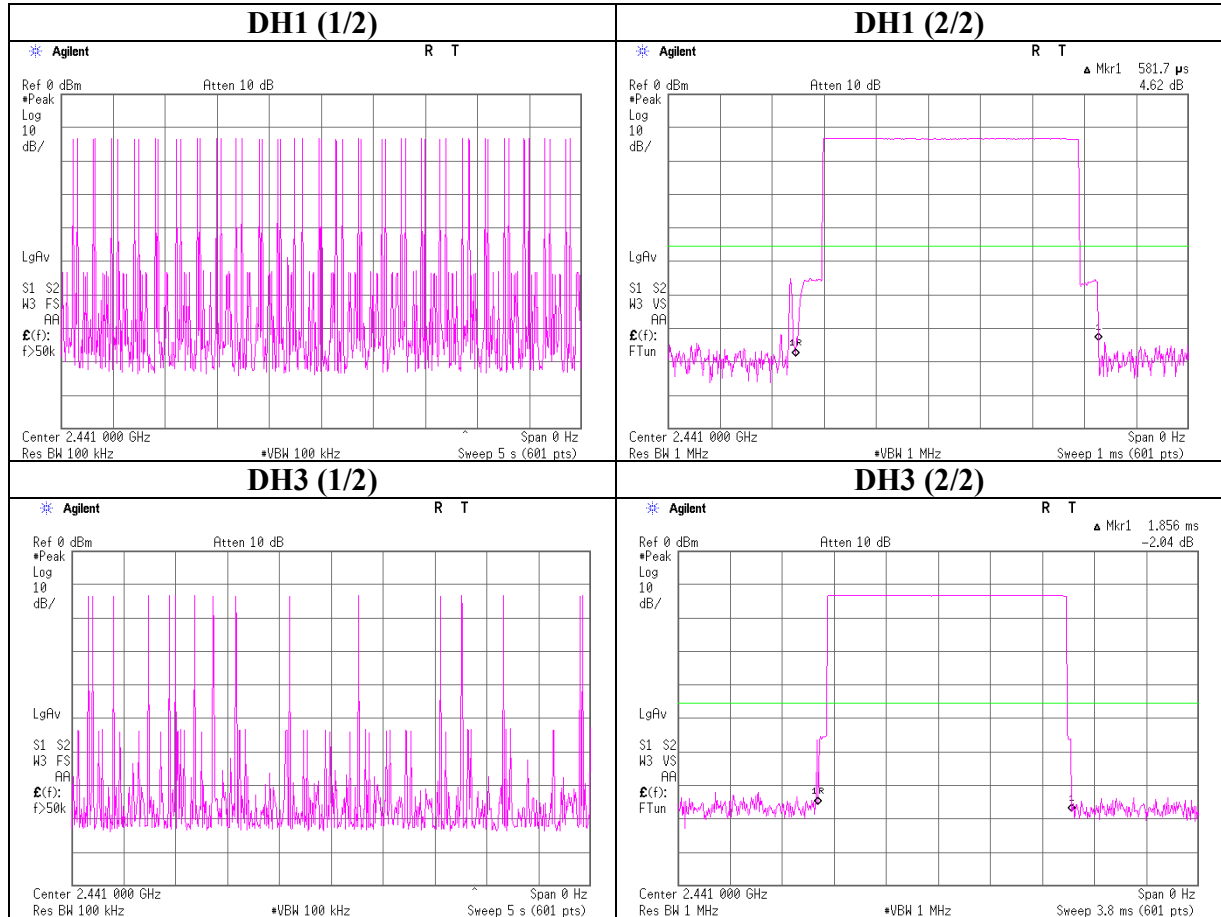
Company	: ALPINE ELECTRONICS, INC.	Test Report No.	: 28DE0027-HO
Equipment	: Bluetooth Module Board	Regulation	: FCC15.247(a)(1)(iii)/RSS-210A8.1(d)
Model No.	: UGZZ4-301B	Test distance	: -
Serial No.	: 1	Date	: 11/30/2007
Power	: DC12V (Module DC3.3V)	Temperature	: 24deg.C
Mode	: Tx (Hopping on) /Inquiry	Humidity	: 38%
		Engineer	: Norihisa Hashimoto

Mode	Number of transmission in a 31.6(79 Hopping x 0.4) / 12.8(32 Hopping x 0.4)second period	Length of transmission time [msec]	Result [msec]	Limit [msec]
DH1	50 times / 5 sec. x 31.6 sec. = 316 times	0.582	184	400
DH3 *1	15 times / 5 sec. x 31.6 sec. = 95 times	1.856	176	400
DH5 *2	11 times / 5 sec. x 31.6 sec. = 70 times	3.121	218	400
Inquiry	100 times / 1 sec. x 12.8 sec. = 1280 times	0.264	337	400

\*1 (16+14+17+14+16)÷5 = 15.4 ≒ 15times

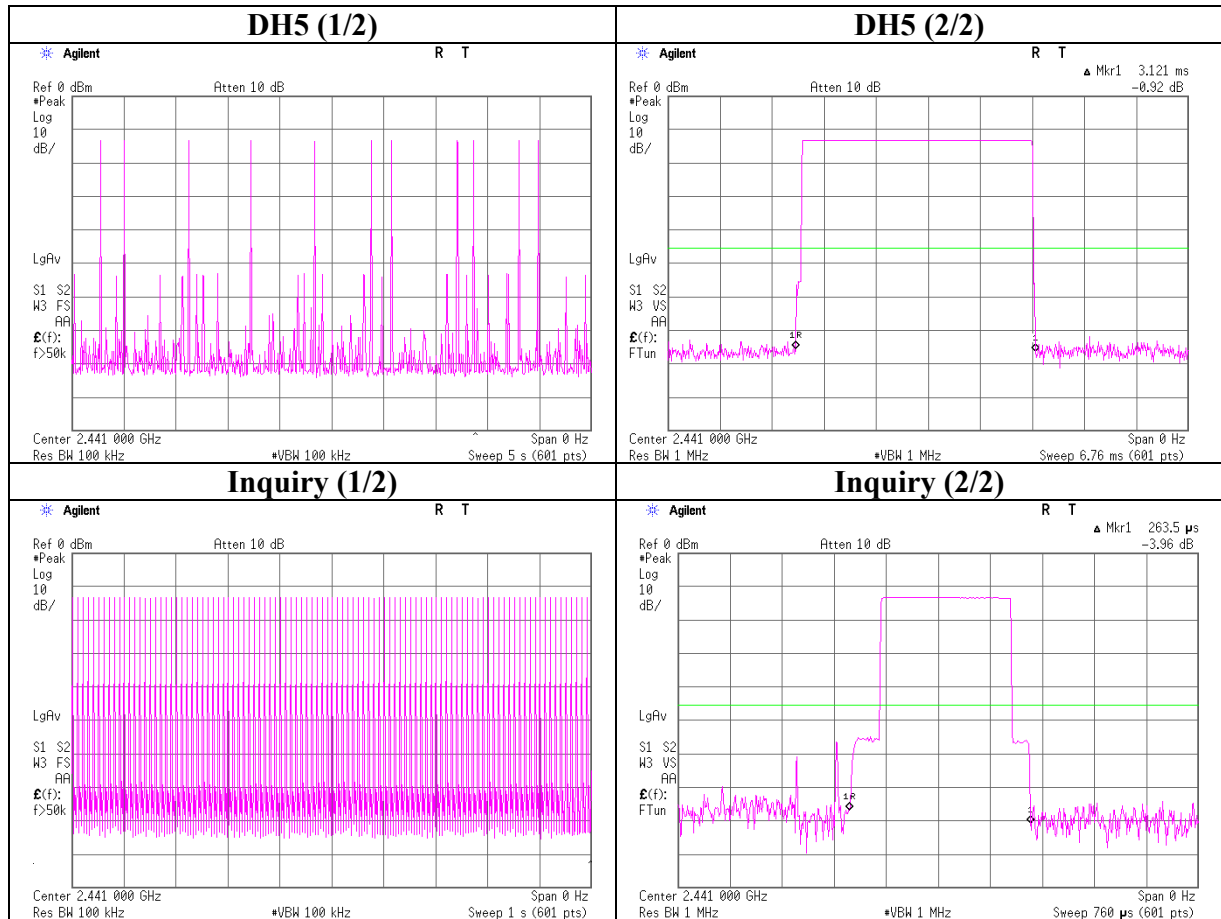
\*2 (11+10+10+15+8)÷5 = 10.8 ≒ 11times

**Dwell time**





**Dwell time**



## Maximum Peak Output Power

	UL Japan, Inc.
	Head Office EMC Lab. No.2 Measurement Room
Company : ALPINE ELECTRONICS, INC.	Test Report No. : 28DE0027-HO
Equipment : Bluetooth Module Board	Regulation : FCC15.247(b)(1)/RSS-210A8.4(2)
Model No. : UGZZ4-301B	Test distance : -
Serial No. : 1	Date : 11/30/2007
Power : DC12V (Module DC3.3V)	Temperature : 24deg.C
Mode : Tx(Hopping Off)/Inquiry	Humidity : 38%
	Engineer : Norihisa Hashimoto

Ch	Freq. [MHz]	P/M Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
Low	2402.0	-13.00	2.48	10.01	-0.51	0.89	20.97	125	21.48
Mid	2441.0	-12.87	2.51	10.02	-0.34	0.92	20.97	125	21.31
High	2480.0	-13.44	2.52	10.03	-0.89	0.81	20.97	125	21.86
Inquiry	2441.0	-12.88	2.51	10.02	-0.35	0.92	20.97	125	21.32

Sample Calculation:

$$\text{Result} = \text{Reading} + \text{Cable Loss}(*1) + \text{Attenuator}$$

\* In the above table, factor 0.0dB represents no use of Atten. and/or Filter.

\*1) The Cable loss (from the cable of the customer) is included with 0.58dB.  
For the representative frequency of 2441MHz, Cable loss = 0.58dB + 1.93dB<sup>\*a)</sup> = 2.51dB

\*a) The Cable loss from Microwave Cable of UL Japan, Inc. (Control No.:MCC-06)

### The Cable Loss from the customer

	1.0GHz		2.0GHz		2.5GHz		3.0GHz	
	S21	S12	S21	S12	S21	S12	S21	S12
1	0.35	0.35	0.51	0.51	0.58	0.59	0.65	0.64
2	0.35	0.35	0.51	0.51	0.58	0.59	0.66	0.66
3	0.35	0.35	0.51	0.52	0.58	0.59	0.65	0.65
4	0.35	0.35	0.51	0.51	0.58	0.59	0.66	0.66
5	0.35	0.34	0.52	0.51	0.58	0.58	0.65	0.65
AVE	0.350	0.348	0.512	0.512 <sup>*1)</sup>	0.580	0.588 <sup>*1)</sup>	0.654	0.652
MAX	0.35	0.35	0.52	0.52	0.58	0.59	0.66	0.66
MIN	0.35	0.34	0.51	0.51	0.58	0.58	0.65	0.64

\*1) The test result was calculated with the value.

**Radiated Spurious Emission (below 1GHz)**  
**Tx, Ch:Low**

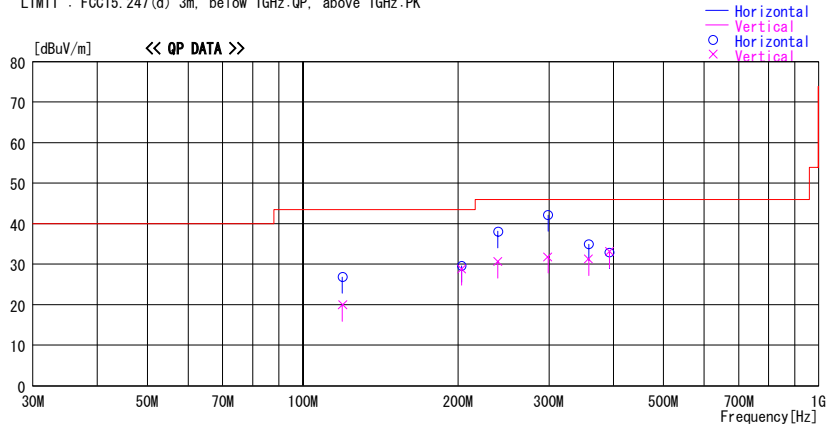
**DATA OF RADIATED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No. 4 Semi Anechoic Chamber  
 Date : 2007/11/20

Company : ALPINE ELECTRONICS, INC.      Report No. : 28DE0027-HO  
 Kind of EUT : Bluetooth Module Board      Power : DC12V  
 Model No. : UGZ4-301B      Temp./Humi. : 25deg. C. / 40%  
 Serial No. : 1      Operator : Shinya Watanabe

Mode / Remarks : Tx 2402MHz Max-Axis

LIMIT : FCC15.247(d) 3m, below 1GHz:QP, above 1GHz:PK



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level [dBuV/m]	Polar.	Limit	
			Factor [dB/m]	Gain [dB]			[dBuV/m]	[dB]
119.499	37.6	QP	13.0	-23.7	26.9	Hori.	43.5	16.6
119.499	30.6	QP	13.0	-23.7	19.9	Vert.	43.5	23.6
203.216	35.7	QP	16.7	-22.8	29.6	Hori.	43.5	13.9
203.216	35.0	QP	16.7	-22.8	28.9	Vert.	43.5	14.7
239.001	43.5	QP	17.1	-22.5	38.1	Hori.	46.0	7.9
239.001	36.0	QP	17.1	-22.5	30.6	Vert.	46.0	15.4
298.760	44.4	QP	19.8	-22.1	42.1	Hori.	46.0	3.9
298.760	34.1	QP	19.8	-22.1	31.8	Vert.	46.0	14.2
358.505	39.6	QP	17.0	-21.7	34.9	Hori.	46.0	11.1
358.505	35.9	QP	17.0	-21.7	31.2	Vert.	46.0	14.8
393.234	36.9	QP	17.5	-21.5	32.9	Hori.	46.0	13.1
393.234	37.1	QP	17.5	-21.5	33.1	Vert.	46.0	12.9

CHART WITH FACTOR    ANT TYPE: -30MHz: LOOP, 30-300MHz: BICONICAL, 300MHz-1000MHz: LOGPERIODIC, 1000MHz-: HORN  
 CALCULATION: RESULT = READING + ANT FACTOR + LOSS (CABLE+ATTEN.) - GAIN (AMP)

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

**Radiated Spurious Emission (below 1GHz)**  
**Tx, Ch:Mid**

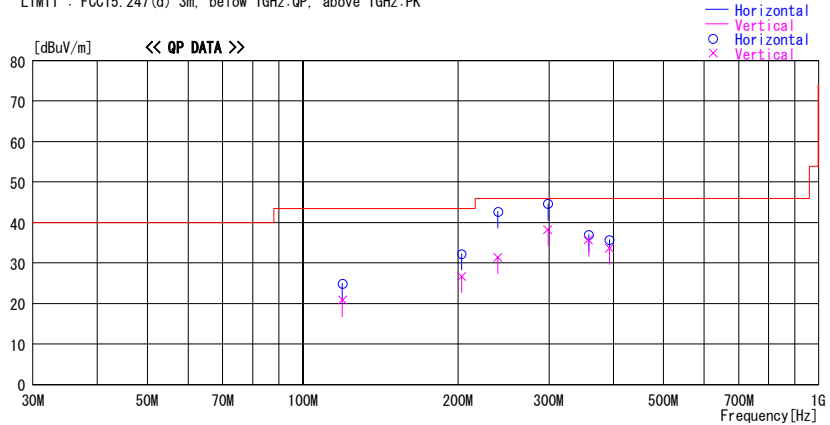
**DATA OF RADIATED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No. 4 Semi Anechoic Chamber  
 Date : 2007/11/20

Company : ALPINE ELECTRONICS, INC.      Report No. : 28DE0027-HO  
 Kind of EUT : Bluetooth Module Board      Power : DC12V  
 Model No. : UGZ24-301B      Temp./Humi. : 25deg. C. / 40%  
 Serial No. : 1      Operator : Shinya Watanabe

Mode / Remarks : Tx 2441MHz Max-Axis

LIMIT : FCC15.247(d) 3m, below 1GHz:QP, above 1GHz:PK



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level [dBuV/m]	Polar.	Limit [dBuV/m]	Margin [dB]
			Factor [dB/m]	Gain [dB]				
119.499	35.6	QP	13.0	-23.7	24.9	Hori.	43.5	18.6
119.499	31.5	QP	13.0	-23.7	20.8	Vert.	43.5	22.7
203.216	38.4	QP	16.7	-22.8	32.3	Hori.	43.5	11.2
203.216	32.8	QP	16.7	-22.8	26.7	Vert.	43.5	16.8
239.001	48.1	QP	17.1	-22.5	42.7	Hori.	46.0	3.3
239.001	36.8	QP	17.1	-22.5	31.4	Vert.	46.0	14.6
298.760	46.9	QP	19.8	-22.1	44.6	Hori.	46.0	1.4
298.760	40.5	QP	19.8	-22.1	38.2	Vert.	46.0	7.8
358.505	41.6	QP	17.0	-21.7	36.9	Hori.	46.0	9.1
358.505	40.4	QP	17.0	-21.7	35.7	Vert.	46.0	10.3
393.234	39.7	QP	17.5	-21.5	35.7	Hori.	46.0	10.3
393.234	37.7	QP	17.5	-21.5	33.7	Vert.	46.0	12.3

CHART: WITH FACTOR ANT TYPE: -30MHz: LOOP, 30-300MHz: BICONICAL, 300MHz-1000MHz: LOGPERIODIC, 1000MHz--: HORN  
 CALCULATION: RESULT = READING + ANT FACTOR + LOSS (CABLE+ATTEN.) - GAIN (AMP)

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

**Radiated Spurious Emission (below 1GHz)**  
**Tx, Ch:High**

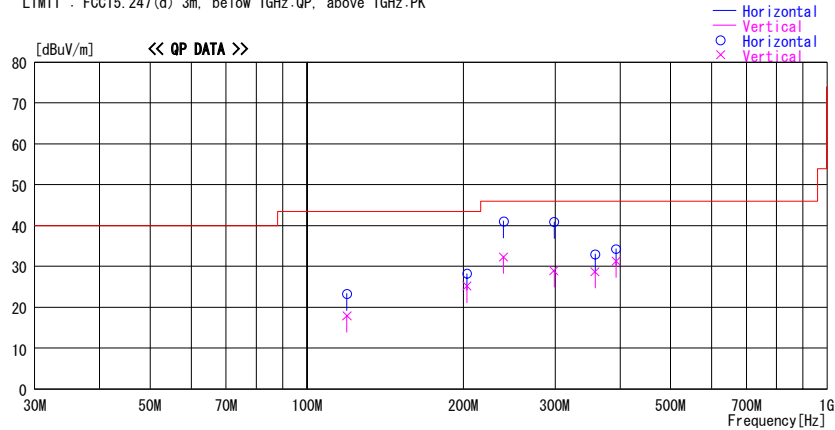
**DATA OF RADIATED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No. 4 Semi Anechoic Chamber  
 Date : 2007/11/20

Company : ALPINE ELECTRONICS, INC.      Report No. : 28DE0027-HO  
 Kind of EUT : Bluetooth Module Board      Power : DC12V  
 Model No. : U6ZZ4-301B      Temp./Humi. : 25deg. C. / 40%  
 Serial No. : 1      Operator : Shinya Watanabe

Mode / Remarks : Tx 2480MHz Max-Axis

LIMIT : FCC15.247(d) 3m, below 1GHz:QP, above 1GHz:PK



Frequency [MHz]	Reading [dBuV]	DET	Antenna		Level [dBuV/m]	Polar.	Limit [dBuV/m]	Margin [dB]
			Factor [dB/m]	Loss& Gain [dB]				
119.499	34.0	QP	13.0	-23.7	23.3	Hori.	43.5	20.2
119.499	28.6	QP	13.0	-23.7	17.9	Vert.	43.5	25.6
203.216	34.4	QP	16.7	-22.8	28.3	Hori.	43.5	15.3
203.216	31.3	QP	16.7	-22.8	25.2	Vert.	43.5	18.3
239.001	46.5	QP	17.1	-22.5	41.1	Hori.	46.0	4.9
239.001	37.7	QP	17.1	-22.5	32.3	Vert.	46.0	13.7
298.760	43.2	QP	19.8	-22.1	40.9	Hori.	46.0	5.1
298.760	31.2	QP	19.8	-22.1	28.9	Vert.	46.0	17.1
358.505	37.7	QP	17.0	-21.7	33.0	Hori.	46.0	13.1
358.505	33.4	QP	17.0	-21.7	28.7	Vert.	46.0	17.3
393.234	38.3	QP	17.5	-21.5	34.3	Hori.	46.0	11.7
393.234	35.3	QP	17.5	-21.5	31.3	Vert.	46.0	14.7

CHART:WITH FACTOR ANT TYPE: -30MHz:LOOP, 30-300MHz:BICONICAL, 300MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN  
 CALCULATION:RESULT = READING + ANT FACTOR + LOSS (CABLE+ATTEN.) - GAIN (AMP)

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

**Radiated Spurious Emission (below 1GHz)**  
**Rx, Ch:Mid**

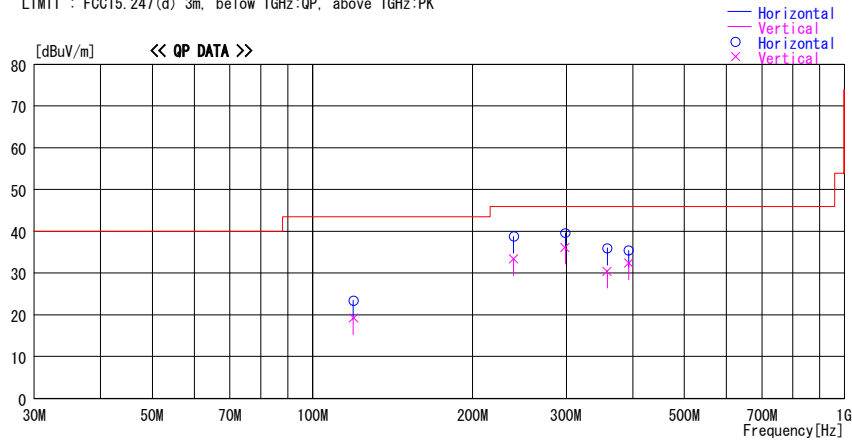
**DATA OF RADIATED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber  
 Date : 2007/11/20

Company : ALPINE ELECTRONICS, INC.      Report No. : 28DE0027-HO  
 Kind of EUT : Bluetooth Module Board      Power : DC12V  
 Model No. : UGZZ4-301B      Temp./Humi. : 25deg. C. / 40%  
 Serial No. : 1      Operator : Shinya Watanabe

Mode / Remarks : Rx 2441MHz Max-Axis

LIMIT : FCC15.247(d) 3m, below 1GHz:QP, above 1GHz:PK



Frequency [MHz]	Reading [dBuV]	DET	Antenna		Level [dBuV/m]	Polar.	Limit [dBuV/m]	Margin [dB]
			Factor [dB/m]	Gain [dB]				
119.499	34.2	QP	13.0	-23.7	23.5	Hori.	43.5	20.1
119.499	29.9	QP	13.0	-23.7	19.2	Vert.	43.5	24.3
239.001	44.2	QP	17.1	-22.5	38.8	Hori.	46.0	7.2
239.001	38.9	QP	17.1	-22.5	33.5	Vert.	46.0	12.6
298.760	41.9	QP	19.8	-22.1	39.6	Hori.	46.0	6.4
298.760	38.4	QP	19.8	-22.1	36.1	Vert.	46.0	9.9
358.505	40.7	QP	17.0	-21.7	36.0	Hori.	46.0	10.1
358.505	35.1	QP	17.0	-21.7	30.4	Vert.	46.0	15.6
393.234	39.4	QP	17.5	-21.5	35.4	Hori.	46.0	10.6
393.234	36.4	QP	17.5	-21.5	32.4	Vert.	46.0	13.6

CHART: WITH FACTOR    ANT TYPE: -30MHz: LOOP, 30-300MHz: BICONICAL, 300MHz-1000MHz: LOGPERIODIC, 1000MHz-: HORN  
 CALCULATION: RESULT = READING + ANT FACTOR + LOSS (CABLE+ATTEN.) - GAIN (AMP)

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

**Radiated Spurious Emission (above 1GHz)**  
**Tx, Ch:Low**

UL Japan, Inc.  
Head Office EMC Lab. No.4Semi Anechoic Chamber

Company : ALPINE ELECTRONICS, INC.      REPORT NO : 28DE0027-HO  
Equipment : Bluetooth Module Board      REGULATION : FCC15.247(d)/RSS-210A8.5  
Model No. : UGZZ4-301B      TEST DISTANCE : 3/1m  
Sample No. : 1      DATE : 11/19/2007      : 11/20/2007  
Power : DC 12V (Module DC3.3V)      TEMPERATURE : 25deg.C      : 25deg.C  
Mode : Bluetooth Tx 2402MHz      HUMIDITY : 40%      : 40%  
Remarks : Hor X , Ver Y-axis      ENGINEER : Shinya Watanabe      : Shinya Watanabe

No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Hi-Pass Filter [dB]	RESULT		Limit PK [dBuV/m]	MARGIN	
		HOR	VER					HOR	VER		HOR	VER
		[dBuV]						[dB]			[dB]	
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss												
1	1199.9	47.3	48.5	25.0	34.1	1.8	0.0	40.0	41.2	73.9	33.9	32.7
2	1396.0	45.3	45.9	25.4	33.5	1.9	0.0	39.1	39.7	73.9	34.8	34.2
3	1496.0	49.1	44.0	25.6	33.3	1.9	0.0	43.3	38.2	73.9	30.6	35.7
4	1702.0	46.9	49.3	25.7	32.8	2.1	0.0	41.9	44.3	73.9	32.0	29.6
5	2390.0	45.0	44.5	27.0	32.1	2.5	0.0	42.4	41.9	73.9	31.5	32.0
6*	2400.0	75.6	71.9	27.0	32.1	2.5	0.0	73.0	69.3	73.9	-	-
7	4804.0	44.8	48.0	30.8	31.2	3.4	0.9	48.7	51.9	73.9	25.2	22.0
8	4885.0	44.5	43.5	31.0	31.2	3.4	1.0	48.7	47.7	73.9	25.2	26.2
9	7206.0	42.0	43.2	35.7	32.5	4.2	0.7	50.1	51.3	73.9	23.8	22.6
10	9608.0	43.2	42.7	38.2	32.8	5.3	0.5	54.4	53.9	73.9	19.5	20.0
Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss - Dfac												
11	12010.0	41.4	41.8	38.9	33.0	5.5	0.0	43.3	43.7	73.9	30.6	30.2
12	14412.0	41.0	41.1	41.1	32.5	6.0	0.0	46.1	46.2	73.9	27.8	27.7
13	16814.0	44.3	43.6	39.2	32.3	6.5	0.0	48.2	47.5	73.9	25.7	26.4
14	19216.0	45.6	44.4	37.5	32.4	7.1	0.0	48.3	47.1	73.9	25.6	26.8
15	21618.0	44.7	44.6	38.0	32.4	7.5	0.0	48.3	48.2	73.9	25.6	25.7
16	24020.0	45.5	45.5	38.7	32.2	8.1	0.0	50.6	50.6	73.9	23.3	23.3

No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Hi-Pass Filter [dB]	RESULT		Limit AV [dBuV/m]	MARGIN	
		HOR	VER					HOR	VER		HOR	VER
		[dBuV]						[dB]			[dB]	
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss												
1	1199.9	37.9	41.1	25.0	34.1	1.8	0.0	30.6	33.8	53.9	23.3	20.1
2	1396.0	34.7	36.3	25.4	33.5	1.9	0.0	28.5	30.1	53.9	25.4	23.8
3	1496.0	44.7	39.8	25.6	33.3	1.9	0.0	38.9	34.0	53.9	15.0	19.9
4	1702.0	41.4	45.5	25.7	32.8	2.1	0.0	36.4	40.5	53.9	17.5	13.4
5	2390.0	31.4	31.5	27.0	32.1	2.5	0.0	28.8	28.9	53.9	25.1	25.0
6*	2400.0	52.6	50.9	27.0	32.1	2.5	0.0	50.0	48.3	53.9	-	-
7	4804.0	32.9	37.1	30.8	31.2	3.4	0.9	36.8	41.0	53.9	17.1	12.9
8	4885.0	32.2	31.9	31.0	31.2	3.4	1.0	36.4	36.1	53.9	17.5	17.8
9	7206.0	30.4	30.3	35.7	32.5	4.2	0.7	38.5	38.4	53.9	15.4	15.5
10	9608.0	30.8	30.6	38.2	32.8	5.3	0.5	42.0	41.8	53.9	11.9	12.1
Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss - Dfac												
11	12010.0	29.3	29.8	38.9	33.0	5.5	0.0	31.2	31.7	53.9	22.7	22.2
12	14412.0	29.8	29.4	41.1	32.5	6.0	0.0	34.9	34.5	53.9	19.0	19.4
13	16814.0	31.9	31.4	39.2	32.3	6.5	0.0	35.8	35.3	53.9	18.1	18.6
14	19216.0	32.4	32.4	37.5	32.4	7.1	0.0	35.1	35.1	53.9	18.8	18.8
15	21618.0	32.7	32.8	38.0	32.4	7.5	0.0	36.3	36.4	53.9	17.6	17.5
16	24020.0	33.3	33.4	38.7	32.2	8.1	0.0	38.4	38.5	53.9	15.5	15.4

\* Reference data

No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Hi-Pass Filter [dB]	RESULT		Limit 20dBc [dBuV/m]	MARGIN	
		HOR	VER					HOR	VER		HOR	VER
		[dBuV]						[dB]			[dB]	
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss												
1	2402.0	100.3	96.8	27.0	32.1	2.5	0.0	97.7	94.2	-	-	-
2	2400.0	47.6	45.5	27.0	32.1	2.5	0.0	45.0	42.9	Funda-20dB	32.7	31.3

Test Distance 1.0m : Distance Factor(Dfac) = 20log(3/1.0) = 9.5dB

\*Except for the above table : All other spurious emissions were less than 20dB for the limit.

\*In the frequency over the fifth harmonic, the noise from the EUT was not seen.The data above is its base noise.

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

\*Hi-Pass Fiter was not used for factor 0.0dB of the above table.

**Radiated Spurious Emission (above 1GHz)**  
**Tx, Ch:Mid**

UL Japan, Inc.  
Head Office EMC Lab. No.4Semi Anechoic Chamber

Company	: ALPINE ELECTRONICS, INC.	REPORT NO	: 28DE0027-HO
Equipment	: Bluetooth Module Board	REGULATION	: FCC15.247(d)/RSS-210A8.5
Model No.	: UGZZ4-301B	TEST DISTANCE	: 3/1m
Sample No.	: 1	DATE	: 11/19/2007 : 11/20/2007
Power	: DC 12V (Module DC3.3V)	TEMPERATURE	: 25deg.C : 25deg.C
Mode	: Bluetooth Tx 2441MHz	HUMIDITY	: 40% : 40%
Remarks	: Hor X , Ver Y-axis	ENGINEER	: Shinya Watanabe : Shinya Watanabe

**PK DETECT (RBW: 1MHz, VBW: 1MHz)**

No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Hi-Pass Filter [dB]	RESULT		Limit PK [dBuV/m]	MARGIN	
		HOR [dBuV]	VER					HOR	VER		HOR	VER
<b>Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss</b>												
1	1200.0	49.8	52.0	25.0	34.1	1.8	0.0	42.5	44.7	73.9	31.4	29.2
2	1501.9	51.0	53.8	25.6	33.3	2.0	0.0	45.3	48.1	73.9	28.6	25.8
3	1702.2	48.3	49.1	25.7	32.8	2.1	0.0	43.3	44.1	73.9	30.6	29.8
4	4882.0	45.8	46.7	31.0	31.2	3.4	1.0	50.0	50.9	73.9	23.9	23.0
5	7323.0	42.4	42.7	35.9	32.5	4.3	0.7	50.8	51.1	73.9	23.1	22.8
6	9764.0	41.4	41.6	38.3	32.9	5.4	0.5	52.7	52.9	73.9	21.2	21.0
<b>Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss - Dfac</b>												
7	12205.0	42.0	42.8	39.0	32.9	5.5	0.0	44.1	44.9	73.9	29.8	29.0
8	14646.0	42.4	41.4	40.7	32.5	6.0	0.0	47.1	46.1	73.9	26.8	27.8
9	17087.0	44.8	44.5	40.4	32.3	6.6	0.0	50.0	49.7	73.9	23.9	24.2
10	19528.0	44.5	45.2	37.5	32.3	7.2	0.0	47.4	48.1	73.9	26.5	25.8
11	21969.0	44.8	45.1	38.2	32.3	7.5	0.0	48.7	49.0	73.9	25.2	24.9
12	24410.0	45.6	44.8	38.8	32.2	8.2	0.0	50.9	50.1	73.9	23.0	23.8

**AV DETECT (RBW: 1MHz, VBW: 10Hz)**

No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Hi-Pass Filter [dB]	RESULT		Limit AV [dBuV/m]	MARGIN	
		HOR [dBuV]	VER					HOR	VER		HOR	VER
<b>Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss</b>												
1	1200.0	40.8	44.4	25.0	34.1	1.8	0.0	33.5	37.1	53.9	20.4	16.8
2	1501.9	45.3	48.2	25.6	33.3	2.0	0.0	39.6	42.5	53.9	14.3	11.4
3	1702.2	43.6	43.9	25.7	32.8	2.1	0.0	38.6	38.9	53.9	15.3	15.0
4	4882.0	33.8	36.3	31.0	31.2	3.4	1.0	38.0	40.5	53.9	15.9	13.4
5	7323.0	29.6	29.6	35.9	32.5	4.3	0.7	38.0	38.0	53.9	15.9	15.9
6	9764.0	29.0	28.9	38.3	32.9	5.4	0.5	40.3	40.2	53.9	13.6	13.7
<b>Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss - Dfac</b>												
7	12205.0	29.6	29.5	39.0	32.9	5.5	0.0	31.7	31.6	53.9	22.2	22.3
8	14646.0	30.0	29.6	40.7	32.5	6.0	0.0	34.7	34.3	53.9	19.2	19.6
9	17087.0	32.5	32.5	40.4	32.3	6.6	0.0	37.7	37.7	53.9	16.2	16.2
10	19528.0	33.0	32.9	37.5	32.3	7.2	0.0	35.9	35.8	53.9	18.0	18.1
11	21969.0	32.8	32.8	38.2	32.3	7.5	0.0	36.7	36.7	53.9	17.2	17.2
12	24410.0	33.2	33.2	38.8	32.2	8.2	0.0	38.5	38.5	53.9	15.4	15.4

Test Distance 1.0m : Distance Factor(Dfac) = 20log(3/1.0) = 9.5dB

\*Except for the above table : All other spurious emissions were less than 20dB for the limit.

\*In the frequency over the fifth harmonic, the noise from the EUT was not seen. The data above is its base noise.

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

\*Hi-Pass Fiter was not used for factor 0.0dB of the above table.



**Radiated Spurious Emission (above 1GHz)**  
**Tx, Ch:High**

UL Japan, Inc.  
Head Office EMC Lab. No.4Semi Anechoic Chamber

Company	: ALPINE ELECTRONICS, INC.	REPORT NO	: 28DE0027-HO
Equipment	: Bluetooth Module Board	REGULATION	: FCC15.247(d)/RSS-210A8.5
Model No.	: UGZZ4-301B	TEST DISTANCE	: 3/1m
Sample No.	: 1	DATE	: 11/19/2007 : 11/20/2007
Power	: DC 12V (Module DC3.3V)	TEMPERATURE	: 25deg.C : 25deg.C
Mode	: Bluetooth Tx 2480MHz	HUMIDITY	: 40% : 40%
Remarks	: Hor X , Ver Y-axis	ENGINEER	: Shinya Watanabe : Shinya Watanabe

**PK DETECT (RBW: 1MHz, VBW: 1MHz)**

No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Hi-Pass Filter [dB]	RESULT		Limit PK [dBuV/m]	MARGIN	
		HOR	VER					HOR	VER		HOR	VER
		[dBuV]						[dBuV/m]		[dB]		
<b>Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss</b>												
1	1199.8	49.7	52.1	25.0	34.1	1.8	0.0	42.4	44.8	73.9	31.5	29.1
2	1501.8	51.9	54.5	25.6	33.3	2.0	0.0	46.2	48.8	73.9	27.7	25.1
3	1702.0	48.9	49.8	25.7	32.8	2.1	0.0	43.9	44.8	73.9	30.0	29.1
4	2483.5	58.1	54.1	27.2	32.1	2.6	0.0	55.8	51.8	73.9	18.1	22.1
5	4885.9	45.7	47.7	31.0	31.2	3.4	1.0	49.9	51.9	73.9	24.0	22.0
6	4960.0	44.2	47.0	31.2	31.2	3.4	1.0	48.6	51.4	73.9	25.3	22.5
7	7440.0	42.1	42.3	36.1	32.6	4.3	0.7	50.6	50.8	73.9	23.3	23.1
8	9920.0	42.3	42.1	38.4	32.9	5.4	0.5	53.7	53.5	73.9	20.2	20.4
<b>Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss - Dfac</b>												
9	12400.0	42.0	42.4	39.0	32.8	5.6	0.0	44.3	44.7	73.9	29.6	29.2
10	14880.0	42.4	42.2	40.4	32.5	6.1	0.0	46.9	46.7	73.9	27.0	27.2
11	17360.0	43.9	44.7	42.5	32.4	6.6	0.0	51.1	51.9	73.9	22.8	22.0
12	19840.0	44.3	44.9	37.5	32.3	7.2	0.0	47.2	47.8	73.9	26.7	26.1
13	22320.0	44.8	44.8	38.4	32.5	7.6	0.0	48.8	48.8	73.9	25.1	25.1
14	24800.0	46.0	46.0	38.9	32.2	8.3	0.0	51.5	51.5	73.9	22.4	22.4

**AV DETECT (RBW: 1MHz, VBW: 10Hz)**

No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Hi-Pass Filter [dB]	RESULT		Limit AV [dBuV/m]	MARGIN	
		HOR	VER					HOR	VER		HOR	VER
		[dBuV]						[dBuV/m]		[dB]		
<b>Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss</b>												
1	1199.8	38.1	45.5	25.0	34.1	1.8	0.0	30.8	38.2	53.9	23.1	15.7
2	1501.8	44.9	49.3	25.6	33.3	2.0	0.0	39.2	43.6	53.9	14.7	10.3
3	1702.0	42.7	44.6	25.7	32.8	2.1	0.0	37.7	39.6	53.9	16.2	14.3
4	2483.5	43.0	41.0	27.2	32.1	2.6	0.0	40.7	38.7	53.9	13.2	15.2
5	4885.9	31.7	32.8	31.0	31.2	3.4	1.0	35.9	37.0	53.9	18.0	16.9
6	4960.0	32.0	34.9	31.2	31.2	3.4	1.0	36.4	39.3	53.9	17.5	14.6
7	7440.0	30.0	30.3	36.1	32.6	4.3	0.7	38.5	38.8	53.9	15.4	15.1
8	9920.0	29.6	29.5	38.4	32.9	5.4	0.5	41.0	40.9	53.9	12.9	13.0
<b>Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss - Dfac</b>												
9	12400.0	30.0	29.2	39.0	32.8	5.6	0.0	32.3	31.5	53.9	21.6	22.4
10	14880.0	30.3	30.1	40.4	32.5	6.1	0.0	34.8	34.6	53.9	19.1	19.3
11	17360.0	32.7	32.5	42.5	32.4	6.6	0.0	39.9	39.7	53.9	14.0	14.2
12	19840.0	32.9	32.9	37.5	32.3	7.2	0.0	35.8	35.8	53.9	18.1	18.1
13	22320.0	32.4	32.4	38.4	32.5	7.6	0.0	36.4	36.4	53.9	17.5	17.5
14	24800.0	33.4	33.4	38.9	32.2	8.3	0.0	38.9	38.9	53.9	15.0	15.0

Test Distance 1.0m : Distance Factor(Dfac) = 20log(3/1.0) = 9.5dB

\*Except for the above table : All other spurious emissions were less than 20dB for the limit.

\*In the frequency over the fifth harmonic, the noise from the EUT was not seen. The data above is its base noise.

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

\*Hi-Pass Filter was not used for factor 0.0dB of the above table.

**Radiated Spurious Emission (above 1GHz)**  
**Rx, Ch:Mid**

UL Japan, Inc.  
 Head Office EMC Lab. No.4Semi Anechoic Chamber

Company	: ALPINE ELECTRONICS, INC.	REPORT NO	: 28DE0027-HO
Equipment	: Bluetooth Module Board	REGULATION	: RSS-Gen 4.10
Model No.	: UGZZ4-301B	TEST DISTANCE	: 3m
Sample No.	: 1	DATE	: 11/19/2007
Power	: DC 12V (Module DC3.3V)	TEMPERATURE	: 25deg.C
Mode	: Bluetooth Rx 2441MHz	HUMIDITY	: 40%
Remarks	: Hor X , Ver Y-axis	ENGINEER	: Shinya Watanabe

**PK DETECT** (RBW: 1MHz, VBW: 1MHz)

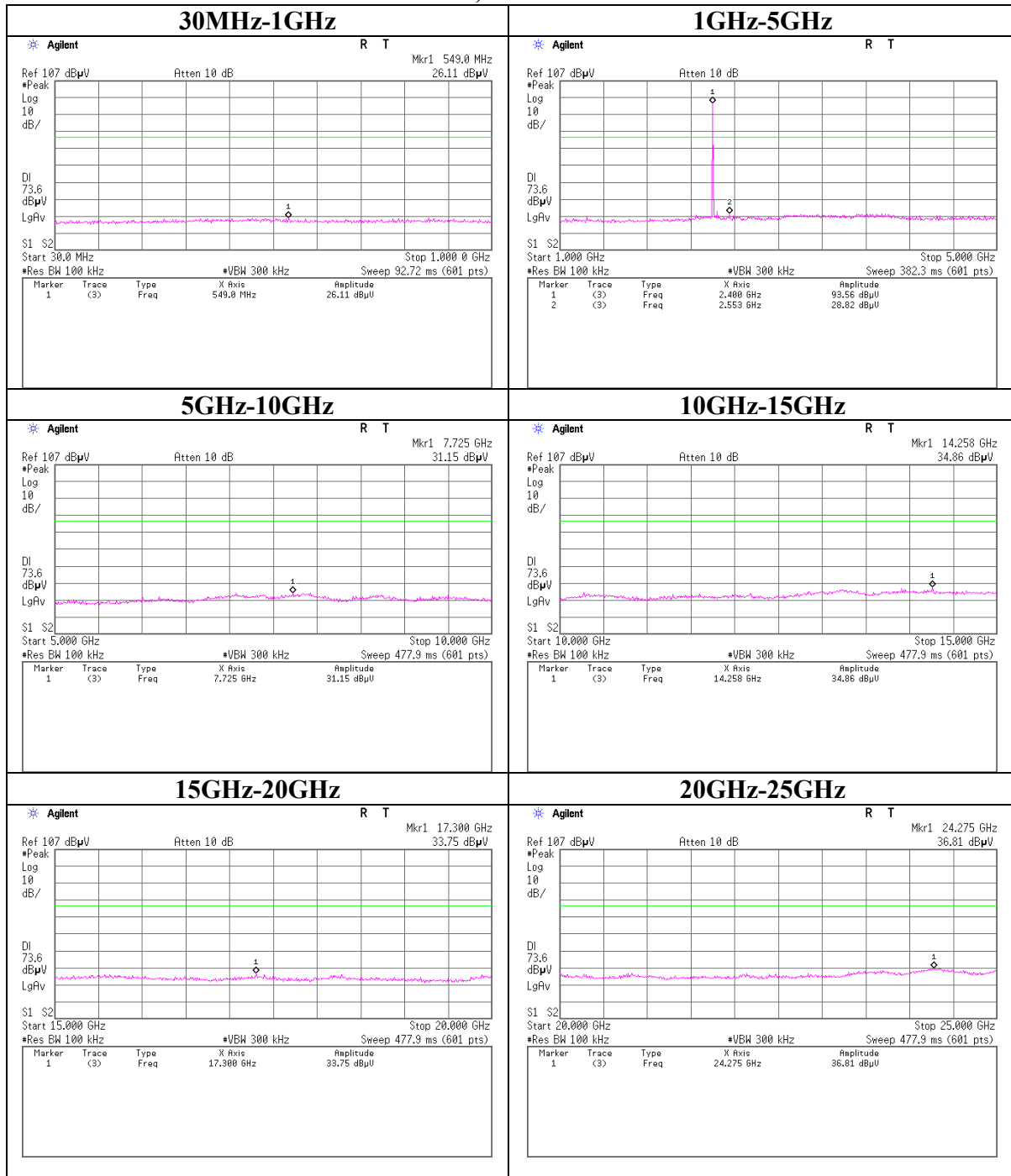
No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Hi-Pass Filter [dB]	RESULT		Limit PK [dBuV/m]	MARGIN	
		HOR	VER					HOR	VER		HOR	VER
		[dBuV]						[dBuV/m]		[dB]		
<b>Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss</b>												
1	1200.0	49.6	53.1	25.0	34.1	1.8	0.0	42.3	45.8	73.9	31.6	28.1
2	1501.9	50.8	55.1	25.6	33.3	2.0	0.0	45.1	49.4	73.9	28.8	24.5
3	1702.2	49.2	50.5	25.7	32.8	2.1	0.0	44.2	45.5	73.9	29.7	28.4
4	4807.9	45.6	50.5	30.8	31.2	3.4	0.0	48.6	53.5	73.9	25.3	20.4

**AV DETECT** (RBW: 1MHz, VBW: 10Hz)

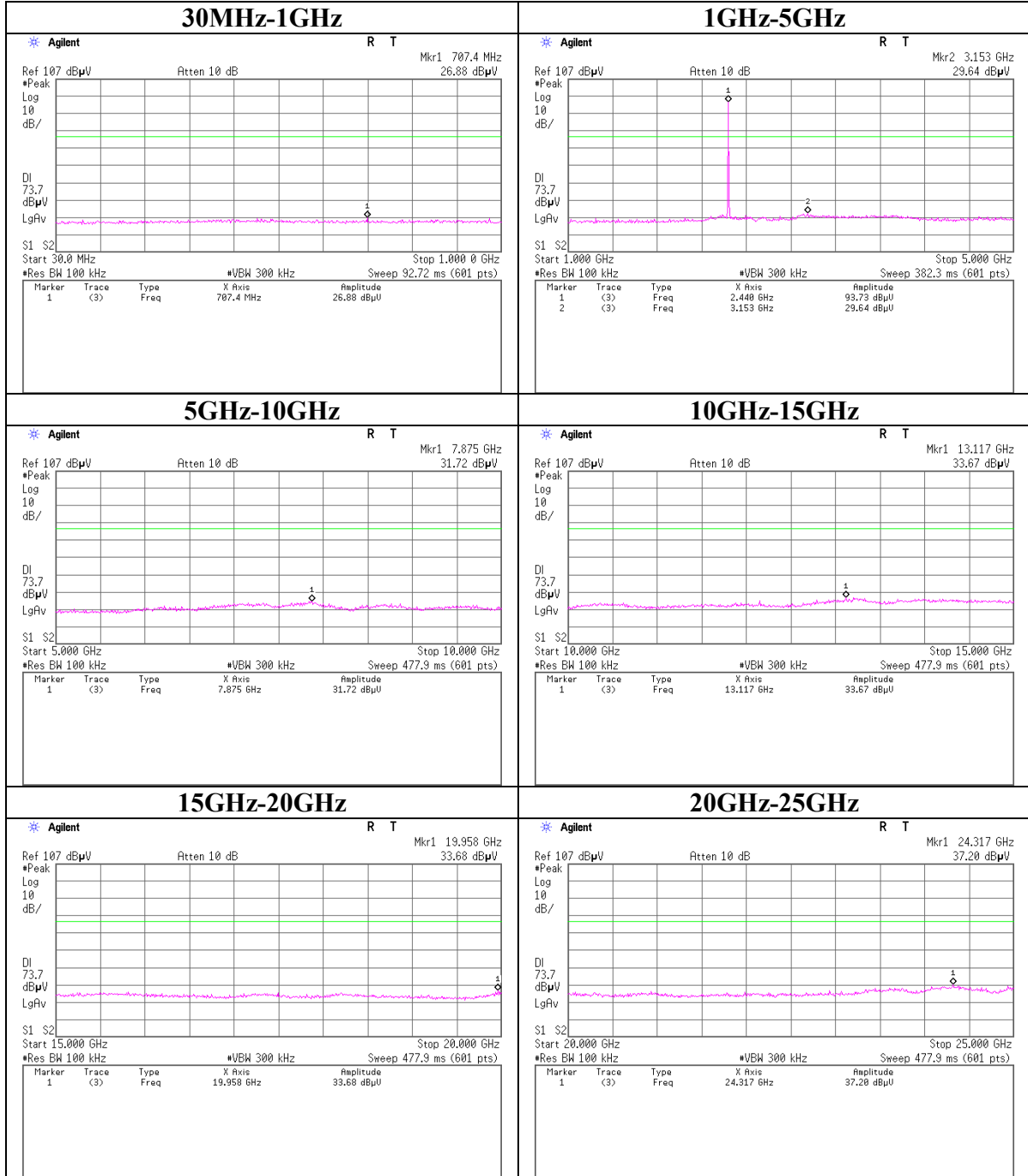
No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Hi-Pass Filter [dB]	RESULT		Limit AV [dBuV/m]	MARGIN	
		HOR	VER					HOR	VER		HOR	VER
		[dBuV]						[dBuV/m]		[dB]		
<b>Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss</b>												
1	1200.0	40.8	46.8	25.0	34.1	1.8	0.0	33.5	39.5	53.9	20.4	14.4
2	1501.9	45.2	48.7	25.6	33.3	2.0	0.0	39.5	43.0	53.9	14.4	10.9
3	1702.2	43.2	45.1	25.7	32.8	2.1	0.0	38.2	40.1	53.9	15.7	13.8
4	4807.9	38.9	46.9	30.8	31.2	3.4	0.0	41.9	49.9	53.9	12.0	4.0

\*Except for the above table : All other spurious emissions were less than 20dB for the limit.  
 \*In the frequency over the fifth harmonic, the noise from the EUT was not seen.The data above is its base noise.  
 \*The test result is rounded off to one or two decimal places, so some differences might be observed.  
 \*Hi-Pass Fiter was not used for factor 0.0dB of the above table.

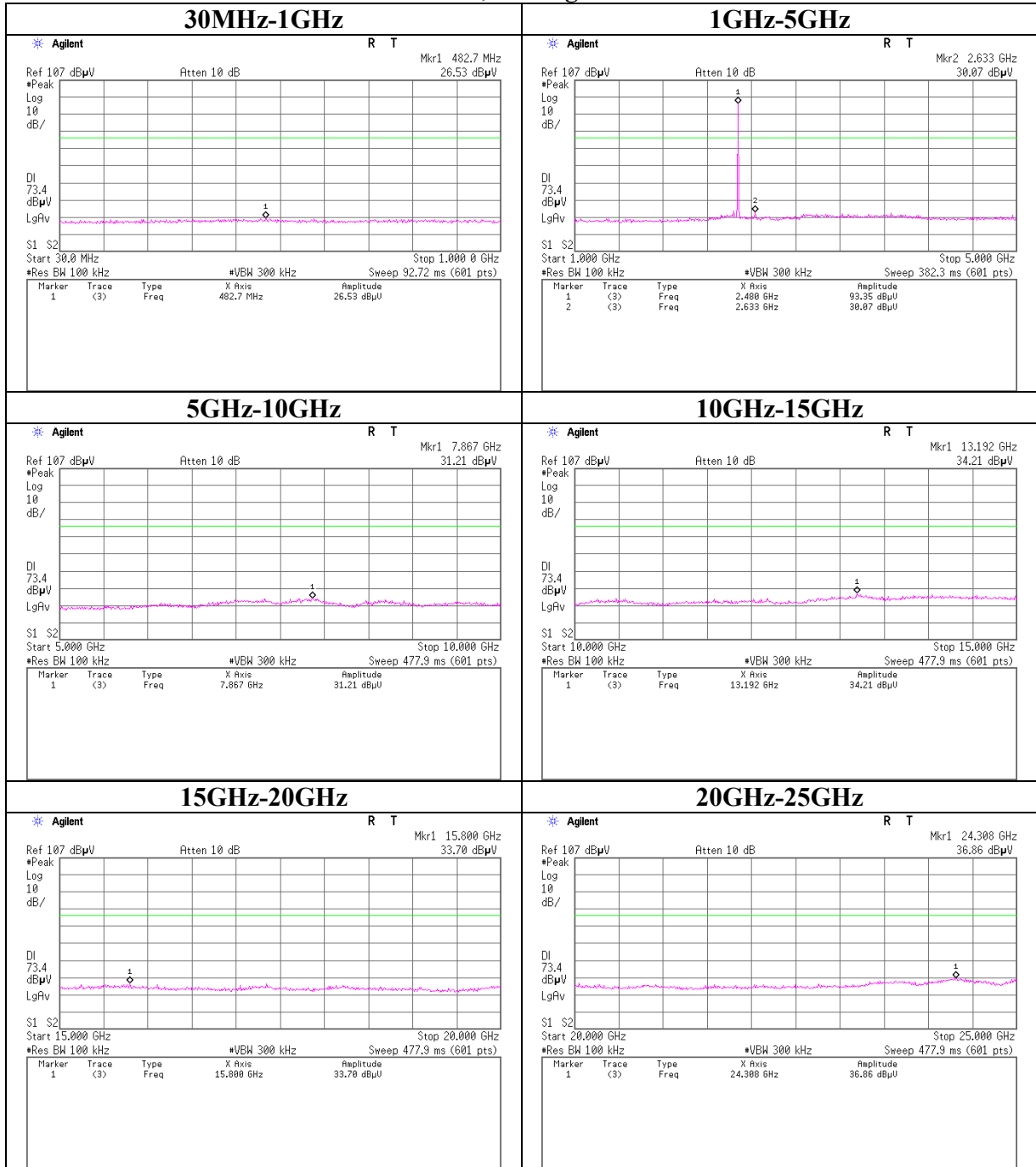
**Conducted Spurious Emission**  
**Tx, Ch:Low**



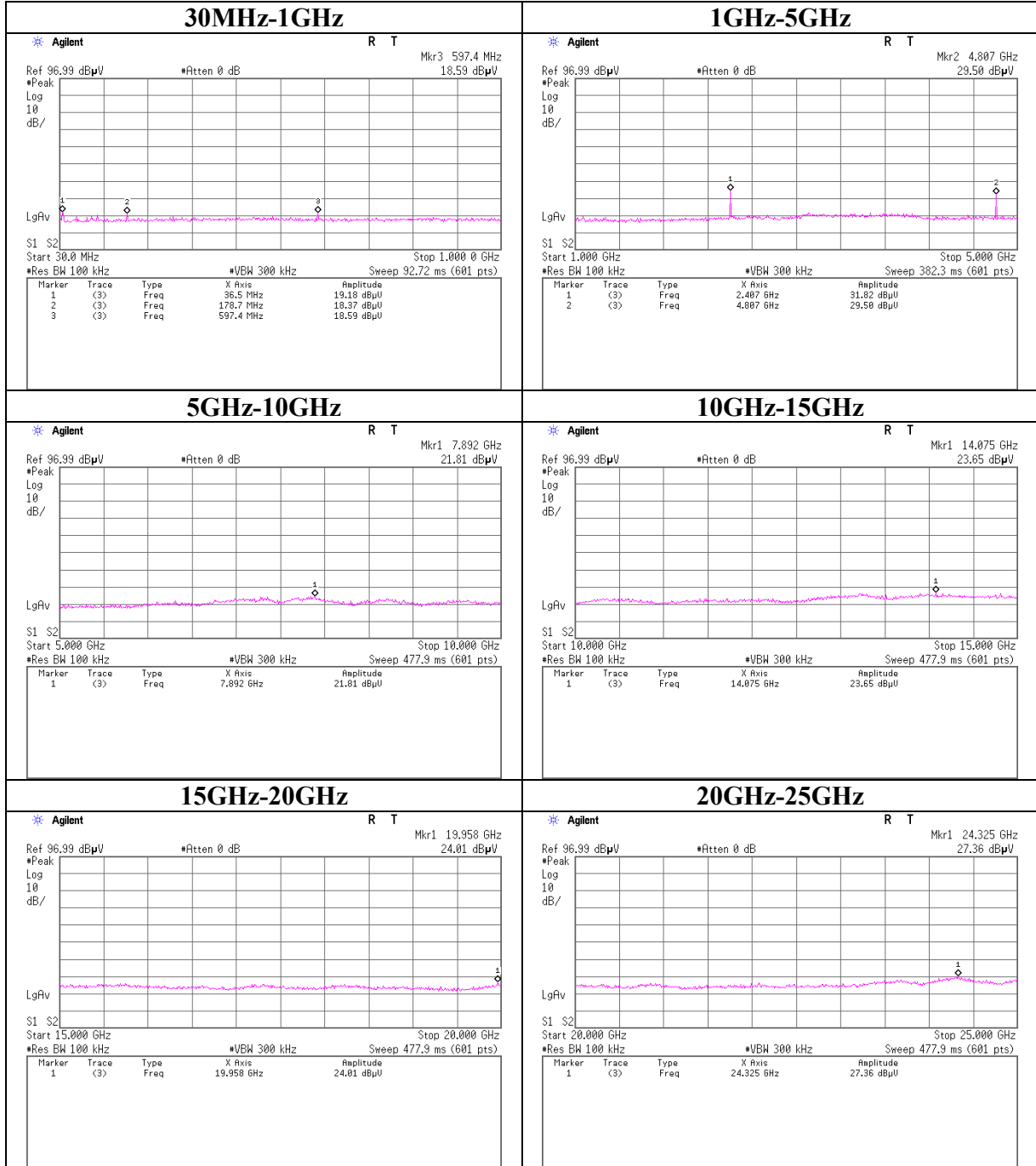
**Conducted Spurious Emission**  
**Tx, Ch:Mid**



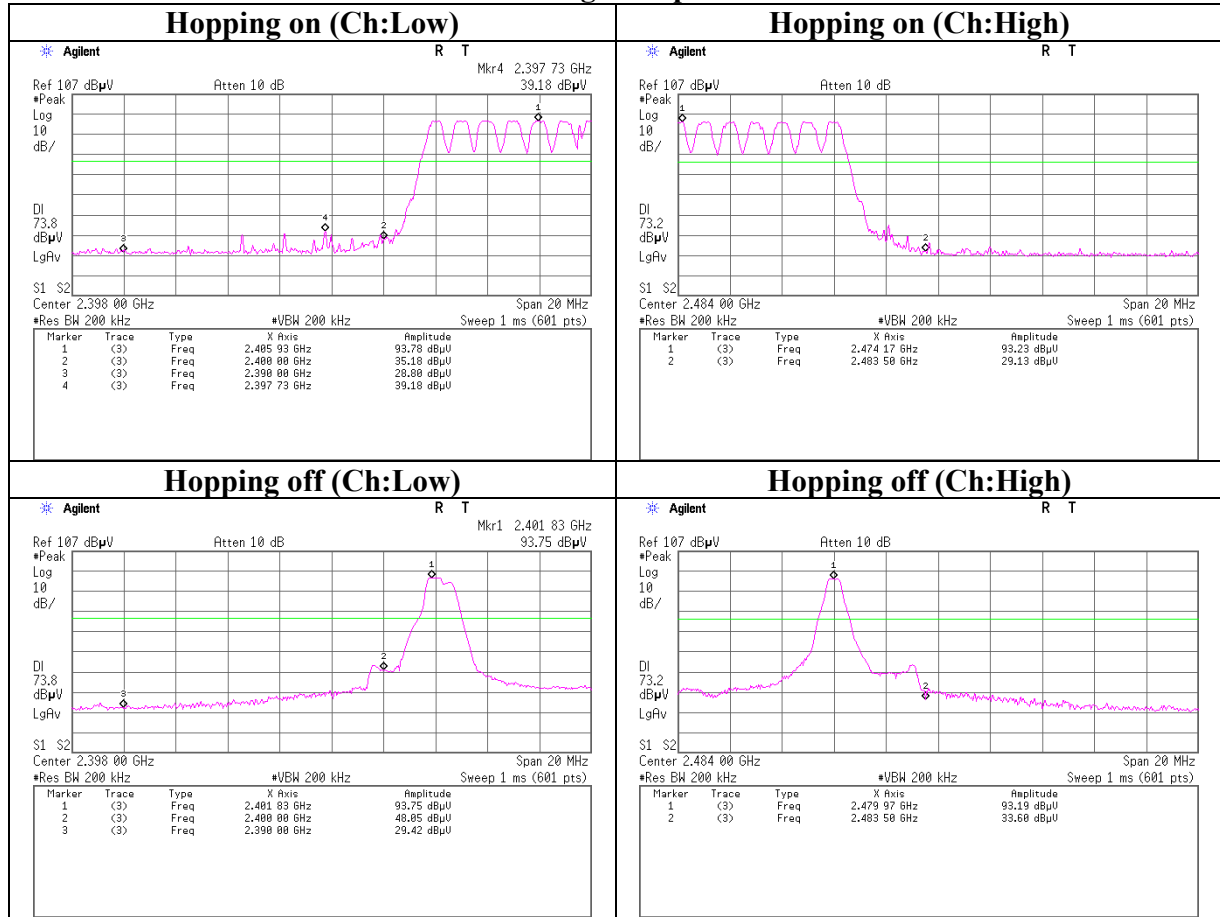
**Conducted Spurious Emission**  
**Tx, Ch:High**



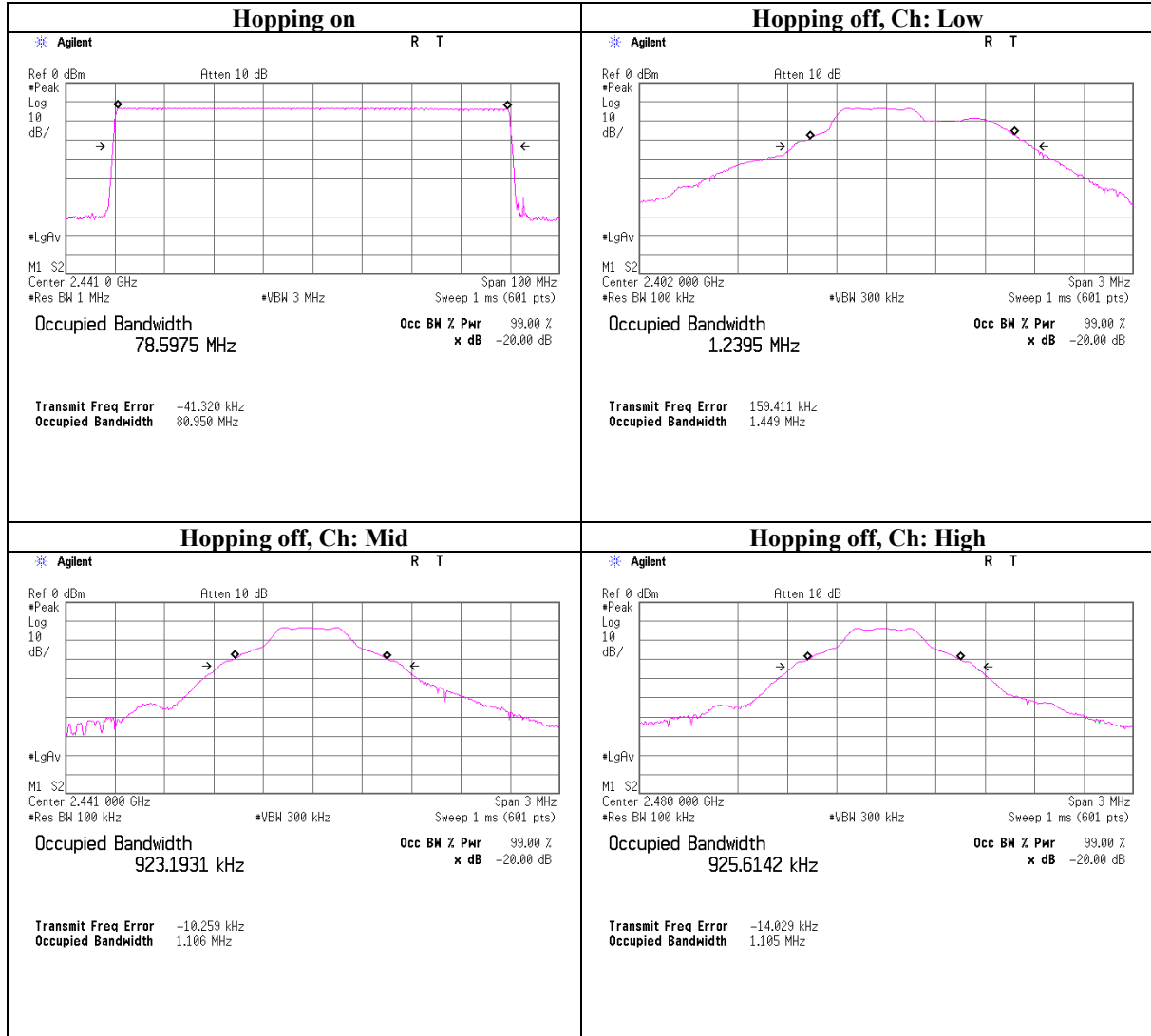
**Conducted Spurious Emission**  
**Rx, Ch:Mid**



**Conducted Spurious Emission**  
**Band Edge compliance**



### 99% Occupied Bandwidth





### APPENDIX 3: Test instruments

#### EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
MAEC-04	Anechoic Chamber	TDK	Semi Anechoic Chamber 3m	RE	2007/03/03 * 12
MHA-21	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	RE	2007/08/16 * 12
MCC-57	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	RE	2007/03/30 * 12
MPA-12	MicroWave System Amplifier	Agilent	83017A	RE	2007/03/12 * 12
MSA-05	Spectrum Analyzer	Advantest	R3273	RE	2007/06/01 * 12
MSTW-14	EMI measurement program	TSJ	TEPTO-DV	RE	-
MOS-15	Thermo-Hygrometer	Custom	CTH-180	RE	2006/01/19 * 24
MJM-07	Measure	PROMART	SEN1955	RE	-
MBA-05	Biconical Antenna	Schwarzbeck	BBA9106	RE	2007/01/19 * 12
MLA-08	Logperiodic Antenna	Schwarzbeck	UKLP9140-A	RE	2007/01/19 * 12
MAT-31	Attenuator(6dB)	TME	UFA-01	RE	2007/03/05 * 12
MCC-50	Coaxial cable	UL Japan	-	RE	2007/03/06 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	RE	2007/03/12 * 12
MTR-07	Test Receiver	Rohde & Schwarz	ESCI	RE	2007/09/14 * 12
MHA-17	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	RE	2007/04/06 * 12
MCC-06	Microwave Cable 1G-26.5GHz 1m	Suhner	SUCOFLEX 104	AT	2007/02/26 * 12
MAT-19	Attenuator(6dB) (above1GHz)	HIROSE ELECTRIC CO.,LTD.	AT-106	AT	2007/01/11 * 12
MRENT-62	Spectrum Analyzer	Agilent	E4448A	AT	2007/11/27 * 12
MOS-14	Thermo-Hygrometer	Custom	CTH-180	AT	2006/01/19 * 24
MSA-10	Spectrum Analyzer	Agilent	E4448A	AT	2007/07/04 * 12
MPM-09	Power Meter	Anritsu	ML2495A	AT	2007/09/22 * 12
MPSE-12	Power sensor	Anritsu	MA2411B	AT	2007/09/22 * 12
MAT-22	Attenuator(10dB) DC-18GHz	Orient Microwave	BX10-0476-00	AT	2007/03/07 * 12
MCC-05	Microwave Cable 1G-40GHz 2m	Storm	421-011 ( 90-1394-079 )	AT	2007/01/12 * 12
MOS-02	Digital Humidity Indicator	N.T	NT-1800	AT	2007/11/12 * 12

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

All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

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

Test Item:

RE: Radiated Emission

AT: Antenna Terminal Conducted test

**UL Japan, Inc.**

**Head Office EMC Lab.**

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