

Test Report

August 7, 2009

No. **29LE0069-SH-E**

Subject : **Measurement Job based on FCC Part15B and FCC part90, for radio communication equipments in vehicle.(SC-980A, FCC90)**

We report the test result based by Job No. **29LE0069-SH**.

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The results in this report apply only to the sample tested.

Customer : **SMART COMMUNICATIONS LIMITED.**

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	☐ Others()	Page : ~
		Total Page : 1 2

Tested by:

K. Adachi
Kenichi Adachi

Approved by:

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- ☒ SHONAN EMC LAB. 1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN TEL +81-463-50-6400 FAX +81-463-50-6401

DATA OF RADIATED EMISSION TEST

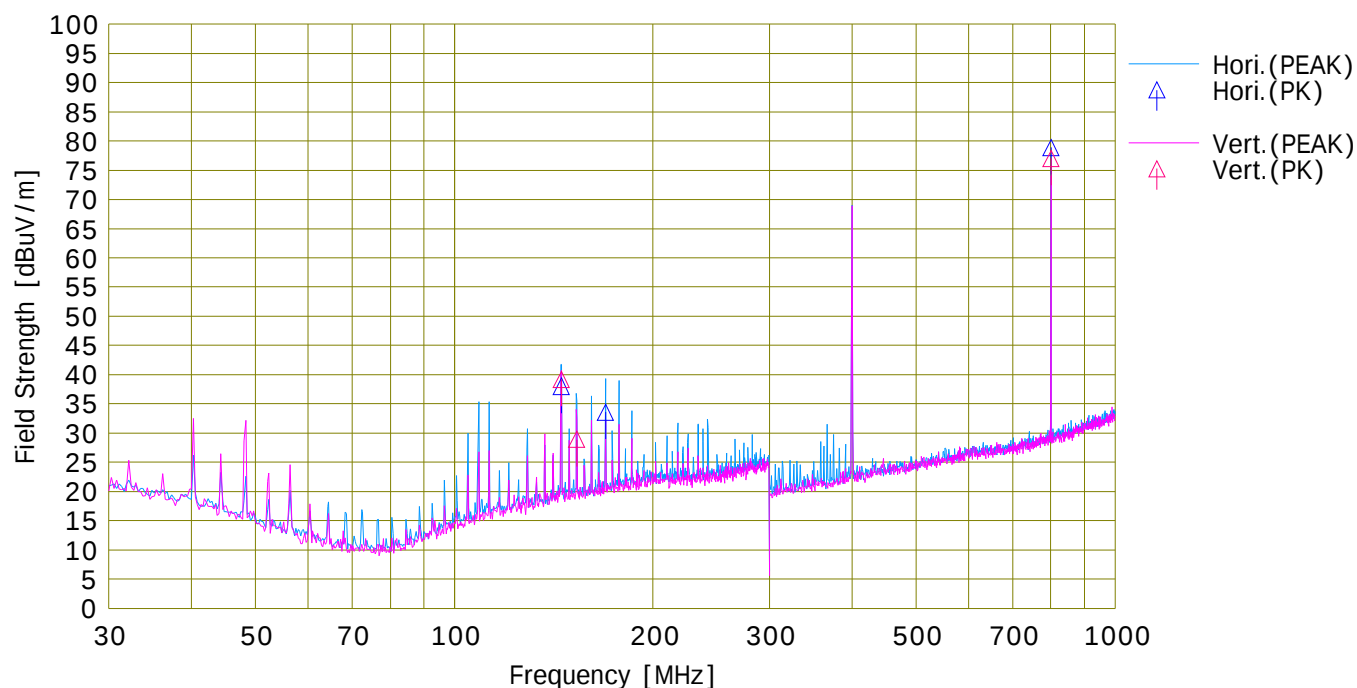
UL Japan, Inc. Shonan EMC Lab. No.1 Semi Anechoic Chamber
Date : 2009/07/28

Company : CSR, Inc.
Kind of EUT : UHF MOBILE TRANSCEIVER
Model No. : SC-980A
Serial No. : No.3

Mode : Transmitting (400.1MHz)
Report No. : 29LE0069-SH
Power : DC 13.6V
Temp./Humi. : 25deg.C. / 81%

Remarks : (below 1GHz: S/A RBW 10kHz, VBW 300kHz, above 1GHz: RBW 1MHz, VBW 3MHz)

Engineer : Kenichi Adachi



No.	Freq.	Reading <PEAK>	Ant.Fac	Loss	Gain	Result <PEAK>	Pola.	Height	Angle	Ant. Type	Comment
	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[H/V]	[cm]	[deg]		
1	145.155	47.2	14.4	8.2	31.8	38.0	Hori.	223	70	BC	non PreAMP, dipole antenna
2	169.347	41.4	15.5	8.4	31.7	33.6	Hori.	188	121	BC	
3	800.200	39.8	27.0	12.1	0.0	78.9	Hori.	100	266	DP	
4	145.154	48.4	14.4	8.2	31.8	39.2	Vert.	100	94	BC	non PreAMP, dipole antenna
5	153.218	37.6	14.7	8.3	31.7	28.9	Vert.	100	90	BC	
6	800.200	37.9	27.0	12.1	0.0	77.0	Vert.	100	237	DP	

DATA OF RADIATED EMISSION TEST

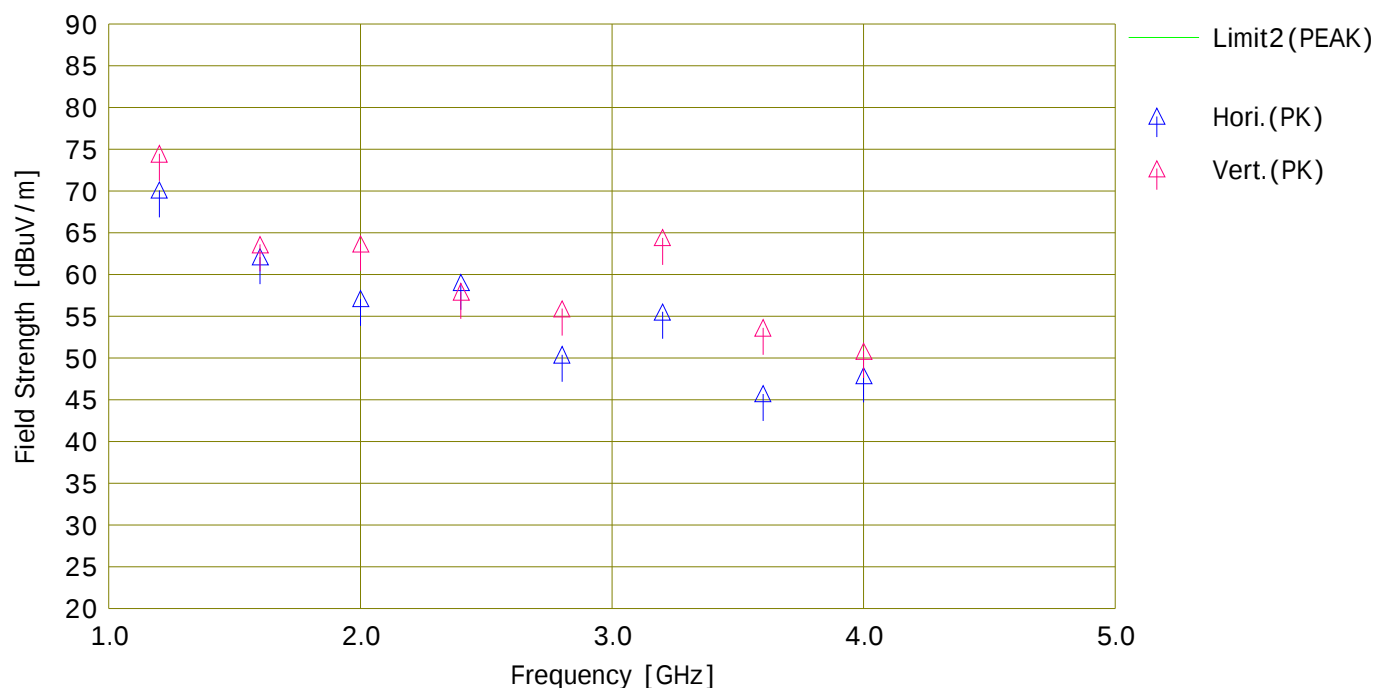
UL Japan, Inc. Shonan EMC Lab. No.1 Semi Anechoic Chamber
Date : 2009/07/30

Company : CSR, Inc.
Kind of EUT : UHF MOBILE TRANSCEIVER
Model No. : SC-980A
Serial No. : No.3

Mode : Transmitting (400.1MHz)
Report No. : 29LE0069-SH
Power : DC 13.6V
Temp./Humi. : 24deg.C. / 69%

Remarks : (below 1GHz: S/A RBW 10kHz, VBW 300kHz, above 1GHz: RBW 1MHz, VBW 3MHz)

Engineer : Kenichi Adachi



No.	Freq.	Reading <PEAK>	Ant.Fac	Loss	Gain	Result <PEAK>	Limit <PEAK>	Margin <PEAK>	Pola.	Height	Angle	Ant. Type	Comment
	[MHz]	[dBuV]	[dB / m]	[dB]	[dB]	[dBuV / m]	[dBuV / m]	[dB]	[H / V]	[cm]	[deg]		
1	1200.300	82.6	24.7	2.5	39.7	70.1	---	---	Hori.	139	219	BC	
2	1600.400	73.3	25.5	2.8	39.5	62.1	---	---	Hori.	100	15	BC	
3	2000.500	67.1	26.3	3.2	39.5	57.1	---	---	Hori.	116	152	BC	
4	2400.600	67.2	27.4	3.6	39.2	59.0	---	---	Hori.	100	172	BC	
5	2800.700	57.9	28.2	3.8	39.5	50.4	---	---	Hori.	138	240	BC	
6	3200.800	62.5	28.8	4.1	39.9	55.5	---	---	Hori.	111	94	BC	
7	3600.900	52.3	29.3	4.4	40.3	45.7	---	---	Hori.	100	148	BC	
8	4001.000	53.8	30.0	4.7	40.6	47.9	---	---	Hori.	100	178	BC	
9	1200.300	87.0	24.7	2.5	39.7	74.5	---	---	Vert.	100	177	BC	
10	1600.400	74.8	25.5	2.8	39.5	63.6	---	---	Vert.	129	122	BC	
11	2000.500	73.7	26.3	3.2	39.5	63.7	---	---	Vert.	108	83	BC	
12	2400.600	66.1	27.4	3.6	39.2	57.9	---	---	Vert.	100	302	BC	
13	2800.700	63.4	28.2	3.8	39.5	55.9	---	---	Vert.	100	314	BC	
14	3200.800	71.4	28.8	4.1	39.9	64.4	---	---	Vert.	105	184	BC	
15	3600.900	60.2	29.3	4.4	40.3	53.6	---	---	Vert.	105	101	BC	
16	4001.000	56.7	30.0	4.7	40.6	50.8	---	---	Vert.	199	101	BC	

Data of Spurious Emissions (Substitution) (30MHz-40GHz)

UL Japan, Inc. Shonan EMC Lab.

Semi Anechoic Chamber : No1

REPORT NO 29LE0069-SH

REGULATION FCC (FCC 2.1053)

TEST DISTANCE 3m (below 26.5GHz)/ 1m (above 26.5GHz)

DATE	July 28, 2009	July 30, 2009
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TEMPERATURE	25 deg.C.	26 deg.C.
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HUMIDITY	81%	74 %
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ENGINEER Kenichi Adachi Kenichi Adachi

COMPANY SMART COMMUNICATIONS LIMITED.

EQUIPMENT UHF FM MOBILE TRANSCEIVER

MODEL NO. SC-980A

SERIAL NO. No.3

POWER DC 13.6V

MODE	Tx	400.1 MHz
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EUT Position	Normal axis
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Antenna Position	Normal axis
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Tx Antenna Height 0.8m

Frequency [MHz]	Rx, T/R or S/A Reading [dBuV]		Tx, SG Reading [dBm]		Tx Cable Loss [dB]	Tx Ant. Gain [dBi]	Tx, Ant. Atten. Loss [dB]	RESULT (ERP) [dBm]		LIMIT [dBm] (ERP)	MARGIN [dB]		Horizontal Rx, Ant. Turn Height [cm] Table [deg.]		Vertical Rx, Ant. Turn Height [cm] Table [deg.]		Remarks
	HOR	VER	HOR	VER				HOR	VER		HOR	VER					
145.16	47.2	48.4	-49.6	-47.0	2.55	2.15	9.94	-62.08	-59.51	-13.00	49.08	46.51	223	70	100	94	
153.21	-	37.6	-	-58.5	2.63	2.15	9.95	-	-71.07	-13.00	-	58.07	-	-	100	90	
169.35	41.4	-	-55.6	-	2.76	2.15	9.96	-68.27	-	-13.00	55.27	-	188	121	-	-	
800.20	39.8	37.9	-7.2	-5.6	6.45	2.15	10.03	-23.68	-22.08	-13.00	10.68	9.08	100	266	100	237	(used SDA-04)
1200.30	82.6	87.0	-30.0	-31.0	2.17	6.66	0.00	-27.65	-28.61	-13.00	14.65	15.61	139	219	100	177	
1600.40	73.3	74.8	-44.0	-43.5	2.63	9.01	0.00	-39.81	-39.22	-13.00	26.81	26.22	100	15	129	122	
2000.50	67.1	73.7	-48.8	-43.1	2.94	10.5	0.00	-43.37	-37.68	-13.00	30.37	24.68	116	152	108	83	
2400.60	67.2	66.1	-47.6	-47.3	3.25	10.41	0.00	-42.55	-42.25	-13.00	29.55	29.25	100	172	100	302	
2800.70	57.9	63.4	-54.9	-48.5	3.52	10.98	0.00	-49.60	-43.20	-13.00	36.60	30.20	138	240	100	314	
3200.80	62.5	71.4	-50.3	-41.7	3.81	11.58	0.00	-44.68	-36.04	-13.00	31.68	23.04	111	94	105	184	
3600.90	52.3	60.2	-52.1	-56.8	4.11	12	0.00	-46.36	-51.01	-13.00	33.36	38.01	100	148	105	101	
4001.00	53.8	56.7	-59.5	-55.7	4.37	12.43	0.00	-53.57	-49.80	-13.00	40.57	36.80	100	178	199	101	

CALCULATION RESULT = SG Reading - Tx Loss + Tx Ant. Gain - Tx Ant. ATT. Loss -2.15

Rx-ANTENNA : Biconical Antenna(30M-300MHz), Logperiodic Antenna(300M-1000MHz), Horn Antenna(1G-12.75GHz)

Tx-ANTENNA : 120MHz tuned Dipole Antenna(30M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-12.75GHz)

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

Detector : Below 1GHz : S/A PK(VBW:10kHz/VBW:300kHz), Above 1GHz : S/A PK(RBW:1MHz/VBW:3MHz)

TIA-603-C, section 2.2.12

FCC90 Transmitters limits for spurious emissions

[illegible]

UL Japan, Inc.

Shonan EMC Lab.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa, Japan 259-1220

Telephone : +81- (0) 463-50-6400

Facsimile : +81- (0) 463-50-6401

DATA OF RADIATED EMISSION TEST

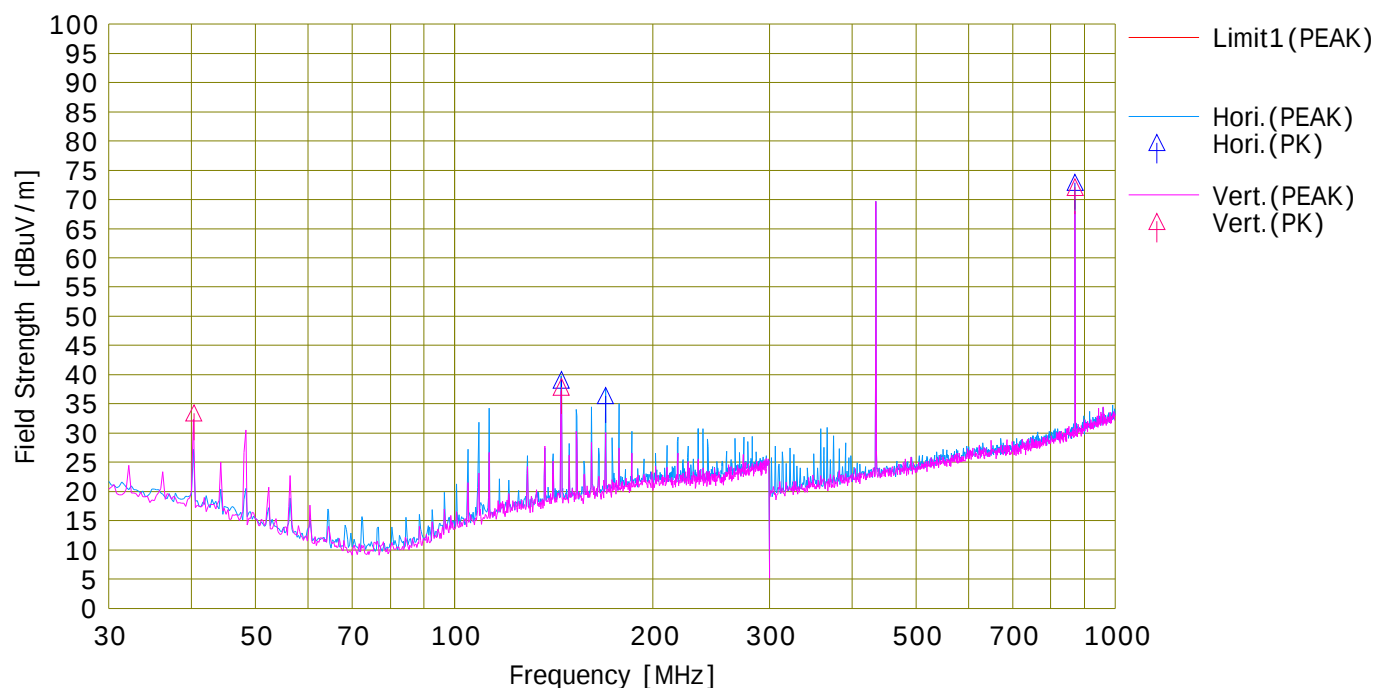
UL Japan, Inc. Shonan EMC Lab. No.1 Semi Anechoic Chambe
Date : 2009/07/28

Company : CSR,Inc.
Kind of EUT : UHF MOBILE TRANSCEIVER
Model No. : SC-980A
Serial No. : No.3

Mode : Transmitting (435.1MHz)
Report No. : 29LE0069-SH
Power : DC 13.6V
Temp./Humi. : 25deg.C. / 81%

Remarks : (below 1GHz: S/A RBW 10kHz, VBW 300kHz, above 1GHz: RBW 1MHz, VBW 3MHz)

Engineer : Kenichi Adachi



No.	Freq.	Reading <PEAK>	Ant.Fac	Loss	Gain	Result <PEAK>	Limit <PEAK>	Margin <PEAK>	Pola.	Height	Angle	Ant. Type	Comment
	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]		
1	145.155	48.3	14.4	8.2	31.8	39.1	---	---	Hori.	218	73	BC	
2	169.348	44.2	15.5	8.4	31.7	36.4	---	---	Hori.	190	116	BC	
3	870.201	71.1	21.5	11.8	31.5	72.9	---	---	Hori.	106	350	LP	
4	40.321	43.4	14.8	7.0	31.8	33.4	---	---	Vert.	100	359	BC	
5	145.154	47.1	14.4	8.2	31.8	37.9	---	---	Vert.	100	73	BC	
6	870.201	70.3	21.5	11.8	31.5	72.1	---	---	Vert.	135	0	LP	

DATA OF RADIATED EMISSION TEST

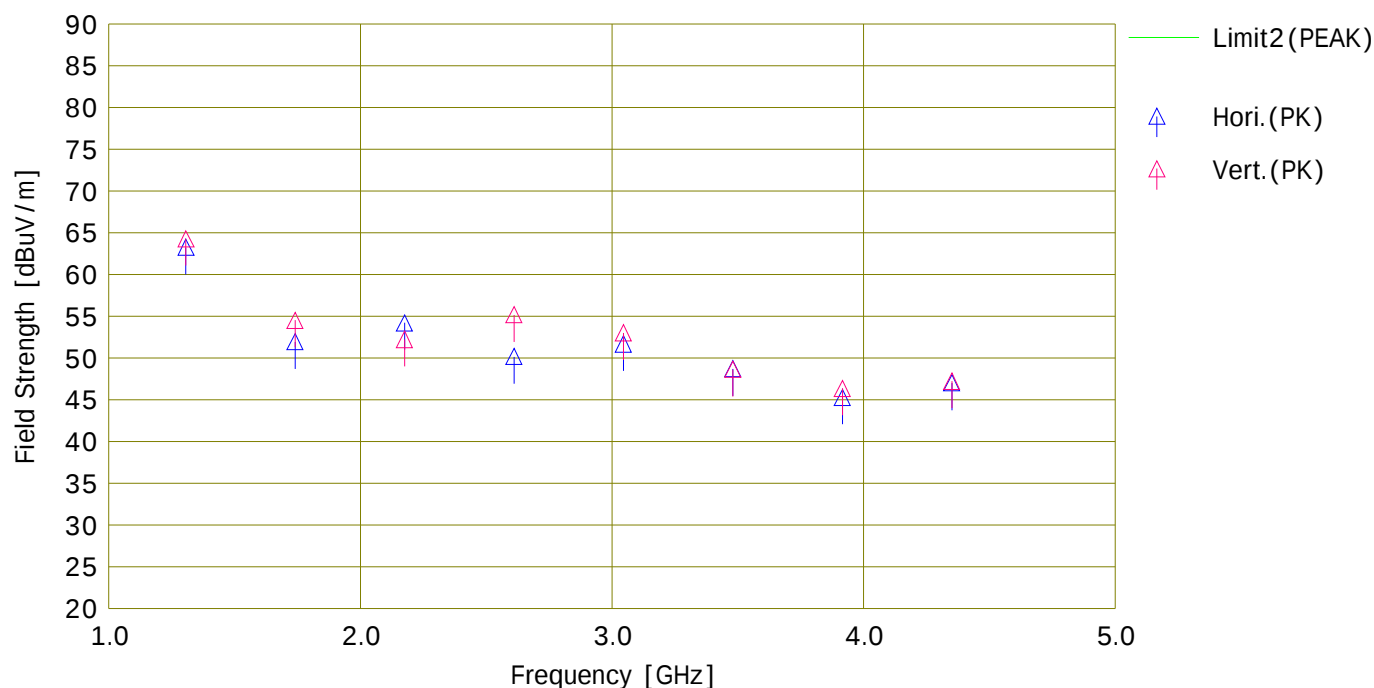
UL Japan, Inc. Shonan EMC Lab. No.1 Semi Anechoic Chambe
Date : 2009/07/31

Company : CSR,Inc.
Kind of EUT : UHF MOBILE TRANSCEIVER
Model No. : SC-980A
Serial No. : No.3

Mode : Transmitting (435.1MHz)
Report No. : 29LE0069-SH
Power : DC 13.6V
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Remarks : (below 1GHz: S/A RBW 10kHz, VBW 300kHz, above 1GHz: RBW 1MHz, VBW 3MHz)

Engineer : Kenichi Adachi



No.	Freq.	Reading <PEAK>	Ant.Fac	Loss	Gain	Result <PEAK>	Limit <PEAK>	Margin <PEAK>	Pola.	Height	Angle	Ant. Type	Comment
	[MHz]	[dBuV]	[dB / m]	[dB]	[dB]	[dBuV / m]	[dBuV / m]	[dB]	[H / V]	[cm]	[deg]		
1	1305.300	75.5	24.9	2.6	39.7	63.3	---	---	Hori.	155	137	BC	
2	1740.400	62.6	25.8	3.0	39.5	51.9	---	---	Hori.	118	298	BC	
3	2175.500	63.5	26.8	3.3	39.4	54.2	---	---	Hori.	114	206	BC	
4	2610.600	57.9	27.8	3.7	39.2	50.2	---	---	Hori.	100	25	BC	
5	3045.700	58.8	28.6	4.0	39.7	51.7	---	---	Hori.	194	352	BC	
6	3480.800	55.5	29.1	4.3	40.2	48.7	---	---	Hori.	100	96	BC	
7	3915.900	51.4	29.8	4.6	40.5	45.3	---	---	Hori.	172	62	BC	
8	4351.000	52.0	30.6	4.7	40.3	47.0	---	---	Hori.	213	27	BC	
9	1305.300	76.5	24.9	2.6	39.7	64.3	---	---	Vert.	160	138	BC	
10	1740.400	65.2	25.8	3.0	39.5	54.5	---	---	Vert.	106	193	BC	
11	2175.500	61.5	26.8	3.3	39.4	52.2	---	---	Vert.	187	350	BC	
12	2610.600	62.9	27.8	3.7	39.2	55.2	---	---	Vert.	132	164	BC	
13	3045.700	60.1	28.6	4.0	39.7	53.0	---	---	Vert.	196	350	BC	
14	3480.800	55.4	29.1	4.3	40.2	48.6	---	---	Vert.	134	78	BC	
15	3915.900	52.5	29.8	4.6	40.5	46.4	---	---	Vert.	100	75	BC	
16	4351.000	52.2	30.6	4.7	40.3	47.2	---	---	Vert.	214	0	BC	

ENGINEER Kenichi Adachi Kenichi Adachi

EUT Position	Normal axis
Antenna Position	Normal axis
Tx Antenna Height	0.8m

TIA-603-C, section 2.2.12

Facsimile : +81- (0) 463-50-6401

DATA OF RADIATED EMISSION TEST

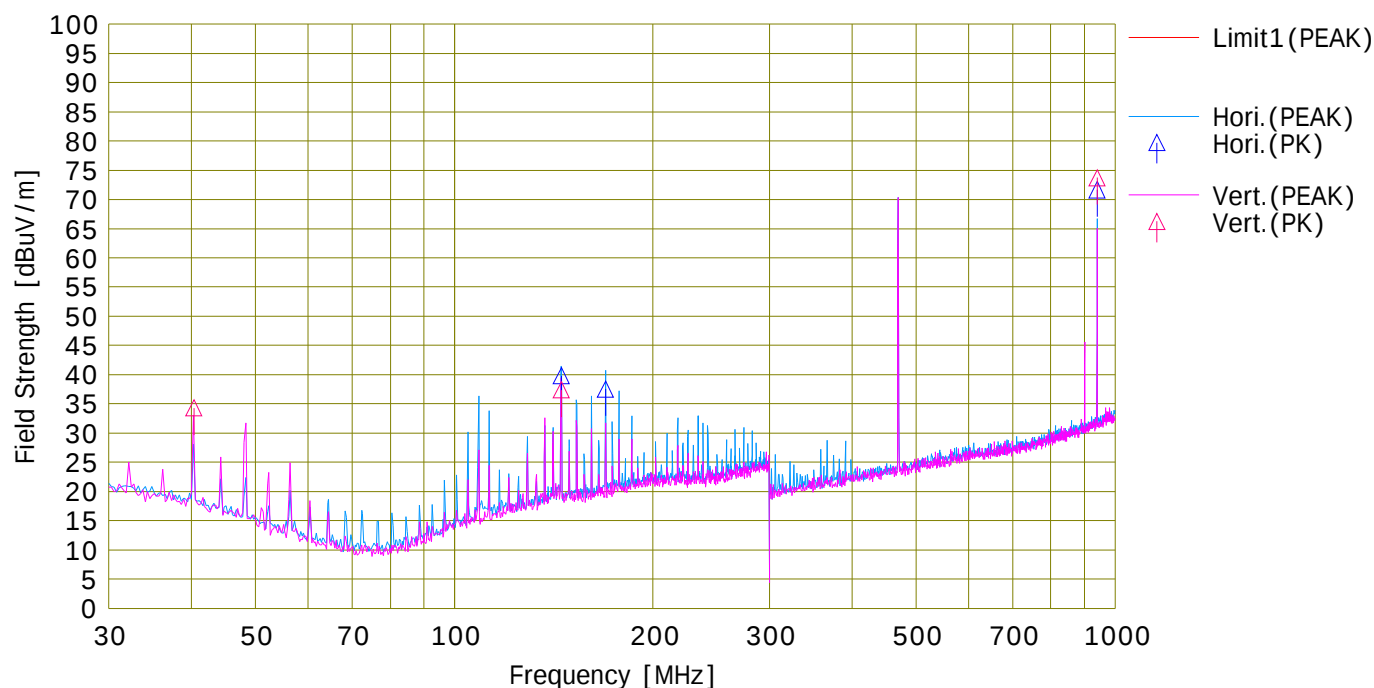
UL Japan, Inc. Shonan EMC Lab. No.1 Semi Anechoic Chambe
Date : 2009/07/28

Company : CSR,Inc.
Kind of EUT : UHF MOBILE TRANSCEIVER
Model No. : SC-980A
Serial No. : No.3

Mode : Transmitting (469.9875MHz)
Report No. : 29LE0069-SH
Power : DC 13.6V
Temp./Humi. : 25deg.C. / 81%

Remarks : (below 1GHz: S/A RBW 10kHz, VBW 300kHz, above 1GHz: RBW 1MHz, VBW 3MHz)

Engineer : Kenichi Adachi



No.	Freq.	Reading <PEAK>	Ant.Fac	Loss	Gain	Result <PEAK>	Limit <PEAK>	Margin <PEAK>	Pola.	Height	Angle	Ant. Type	Comment
	[MHz]	[dBuV]	[dB / m]	[dB]	[dB]	[dBuV / m]	[dBuV / m]	[dB]	[H / V]	[cm]	[deg]		
1	145.156	49.0	14.4	8.2	31.8	39.8	---	---	Hori.	221	75	BC	
2	169.348	45.3	15.5	8.4	31.7	37.5	---	---	Hori.	185	120	BC	
3	939.977	68.4	22.3	12.1	31.1	71.7	---	---	Hori.	103	321	LP	
4	40.322	44.3	14.8	7.0	31.8	34.3	---	---	Vert.	100	53	BC	
5	145.154	46.6	14.4	8.2	31.8	37.4	---	---	Vert.	100	79	BC	
6	939.976	70.4	22.3	12.1	31.1	73.7	---	---	Vert.	126	353	LP	

Calculation: Result [dBuV / m] = Reading [dBuV] + Ant.Fac [dB / m] + Loss (Cable+ATT) [dB] + Gain (AMP) [dB]
Ant.Type=BC:Biconical Antenna, LP:Logperiodic Antenna

DATA OF RADIATED EMISSION TEST

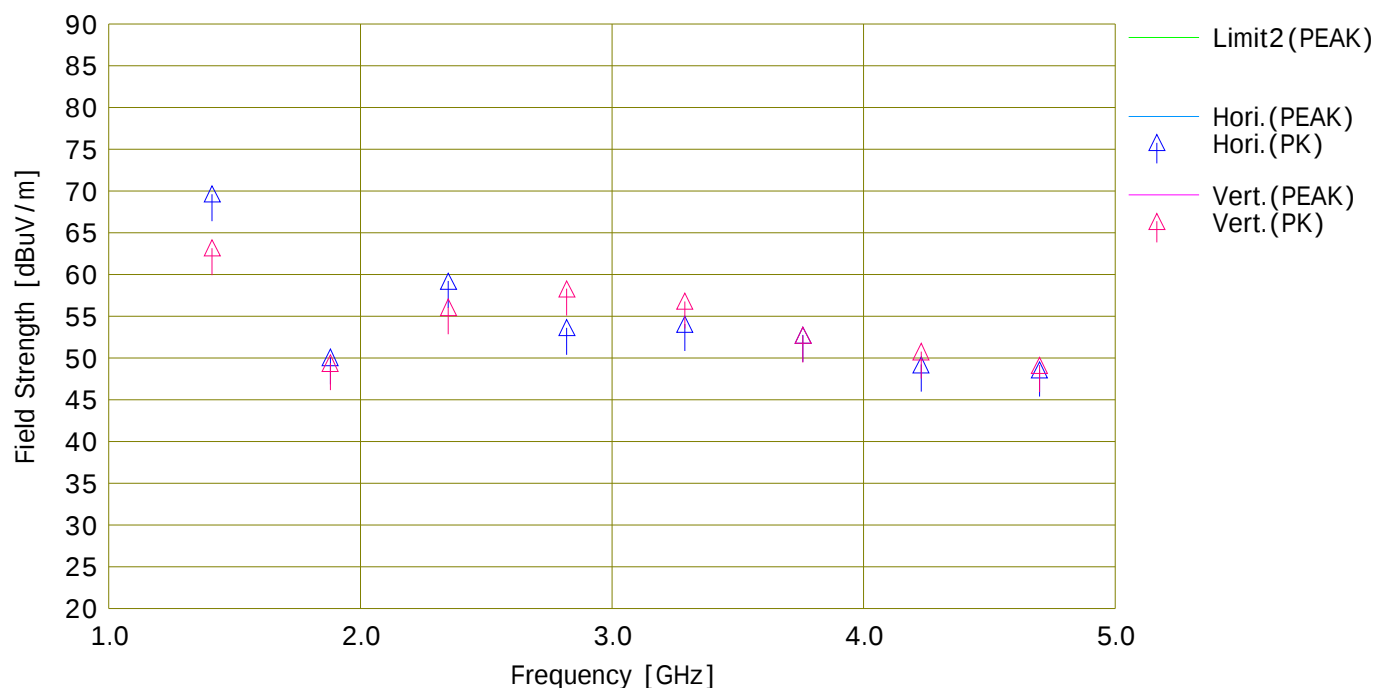
UL Japan, Inc. Shonan EMC Lab. No.1 Semi Anechoic Chamber
Date: 2009/07/31

Company : CSR,Inc.
Kind of EUT : UHF MOBILE TRANSCEIVER
Model No. : SC - 980A
Serial No. : No.3

Mode : Transmitting (469.9875MHz)
Report No. : 29LE0069-SH
Power : DC 13.6V
Temp./Humi. : 24deg.C. / 69%

Remarks : (below 1GHz: S/A RBW 10kHz, VBW 300kHz, above 1GHz: RBW 1MHz, VBW 3MHz)

Engineer : Kenichi Adachi



No.	Freq.	Reading	Ant.Fac	Loss	Gain	Result	Limit	Margin	Pola.	Height	Angle	Ant. Type	Comment
	[MHz]	[dBuV]				<PEAK>	<PEAK>	<PEAK>					
			[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]		
1	1409.960	81.3	25.2	2.7	39.6	69.6	---	---	Hori.	110	0	BC	
2	1879.950	60.4	26.1	3.1	39.5	50.1	---	---	Hori.	114	28	BC	
3	2349.940	67.7	27.2	3.5	39.2	59.2	---	---	Hori.	104	108	BC	
4	2819.930	61.0	28.2	3.9	39.5	53.6	---	---	Hori.	163	183	BC	
5	3289.910	60.9	28.9	4.2	40.0	54.0	---	---	Hori.	100	332	BC	
6	3759.900	59.1	29.5	4.5	40.4	52.7	---	---	Hori.	100	181	BC	
7	4229.890	54.5	30.4	4.7	40.4	49.2	---	---	Hori.	112	78	BC	
8	4699.880	52.5	31.2	5.0	40.1	48.6	---	---	Hori.	143	272	BC	
9	1409.960	74.9	25.2	2.7	39.6	63.2	---	---	Vert.	100	191	BC	
10	1879.950	59.7	26.1	3.1	39.5	49.4	---	---	Vert.	131	199	BC	
11	2349.940	64.6	27.2	3.5	39.2	56.1	---	---	Vert.	100	302	BC	
12	2819.930	65.7	28.2	3.9	39.5	58.3	---	---	Vert.	104	183	BC	
13	3289.910	63.7	28.9	4.2	40.0	56.8	---	---	Vert.	100	359	BC	
14	3759.900	59.1	29.5	4.5	40.4	52.7	---	---	Vert.	100	168	BC	
15	4229.890	56.1	30.4	4.7	40.4	50.8	---	---	Vert.	100	182	BC	
16	4699.880	53.0	31.2	5.0	40.1	49.1	---	---	Vert.	105	175	BC	

Calculation: Result [dBuV/m] = Reading [dBuV] + Ant.Fac [dB/m] + Loss (Cable+ATT) [dB] + Gain (AMP) [dB]
Ant.Type=BC:Biconical Antenna, LP:Logperiodic Antenna

ENGINEER Kenichi Adachi Kenichi Adachi

EUT Position	Normal axis
Antenna Position	Normal axis
Tx Antenna Height	0.8m

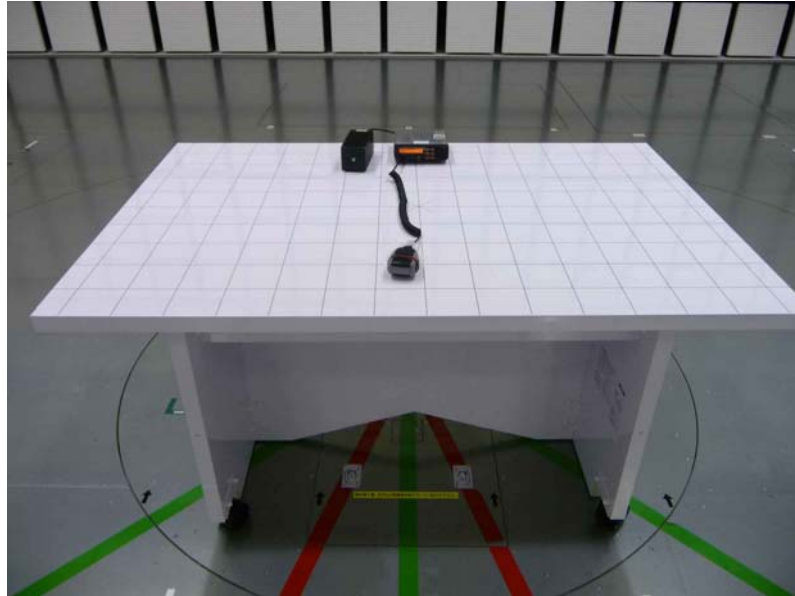
Below 1GHz : S/A FR(VE
TIA-603-C, section 2.2.12

Facsimile : +81- (0) 463-50-6401

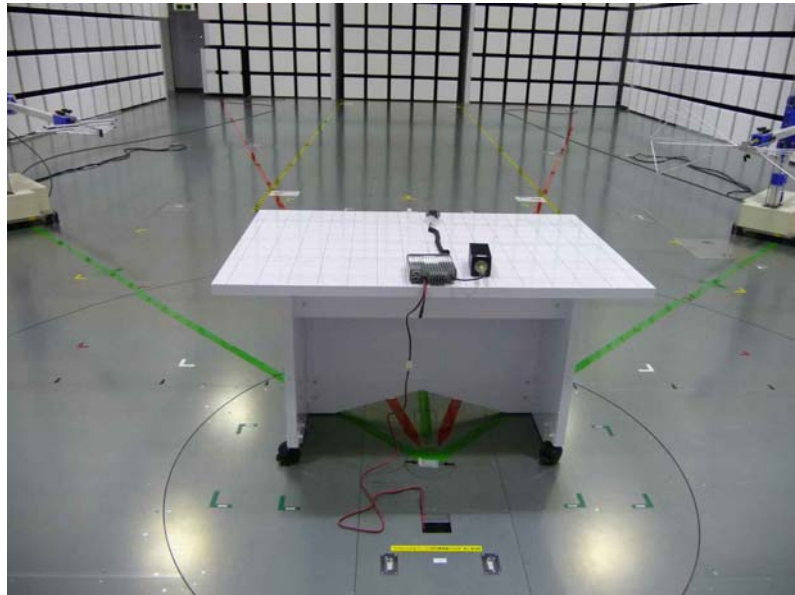
Photographs of test setup

Radiated emission

Front



Rear



UL Japan, Inc.
Shonan EMC Lab.

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

Telephone : +81-(0)463-50-6400
Facsimile : +81-(0)463-50-6401

Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SAEC-01(NSA)	Anechoic Chamber	TDK	SAEC-01(NSA)	1	RE	2009/03/07 * 12
SBA-01	Biconical Antenna	Schwarzbeck	BBA9106	91032664	RE	2009/03/20 * 12
SLA-01	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0888	RE	2009/03/20 * 12
SDA-04	Dipole Antenna	Schwarzbeck	UHA9105	91052451	RE	2009/03/20 * 12
SAT6-01	Attenuator	JFW	50HF-006N	-	RE	2009/02/13 * 12
SAT6-02	Attenuator	JFW	50HF-006N	-	RE	2009/02/13 * 12
SAF-01	Pre Amplifier	SONOMA	310N	290211	RE	2009/02/13 * 12
SCC-A1/A3/A5/A7/A8/A13/SRSE-01	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-269(RF Selector)	RE	2009/04/06 * 12
SCC-A2/A4/A6/A7/A8/A13/SRSE-01	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-269(RF Selector)	RE	2009/04/06 * 12
STR-01	Test Receiver	Rohde & Schwarz	ESU40	100093	RE	2009/04/02 * 12
SJM-01	Measure	KOMELON	KMC-36	-	RE	-
SOS-01	Humidity Indicator	A&D	AD-5681	4062555	RE	2009/02/04 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV	1	RE	-
SSG-02	Signal Generator	Agilent	E8257D-540	MY48051404	RE	2009/02/12 * 12
SCC-07	Coaxial Cable	Fujikura	5D2W	-	RE	2009/06/12 * 12
SDA-08	Dipole Antenna	Schwarzbeck	UHAP	1158	RE	2009/03/20 * 12
SDA-07	Dipole Antenna	Schwarzbeck	VHAP	1177	RE	2009/03/20 * 12
SCC-G21	Coaxial Cable	Suhner	SUCOFLEX 104	296169/4	RE	2009/05/27 * 12
SSG-02	Signal Generator	Agilent	E8257D-540	MY48051404	RE	2009/02/12 * 12
SCC-07	Coaxial Cable	Fujikura	5D2W	-	RE	2009/06/12 * 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

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