



RADIO TEST REPORT

Test Report No. : 33CE0171-HO-C

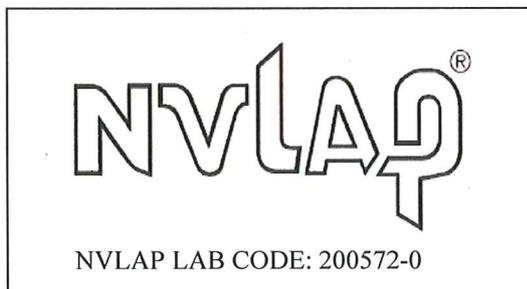
Applicant : Sharp Corporation, Communication Systems Group.
Type of Equipment : Cellular Phone
Model No. : 200SH
Test regulation : FCC Part 15 Subpart C: 2012
FCC ID : APYHRO00181
Test Result : Complied

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with 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.

Date of test: October 29 to November 2, 2012

Representative test engineer: 
Yutaka Yoshida
Engineer of WiSE Japan,
UL Verification Service

Approved by: 
Takahiro Hatakeda
Leader of WiSE Japan,
UL Verification Service



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 : Sharp Corporation, Communication Systems Group.
Address : 2-13-1 Iida Hachihonmatsu HigashiHiroshima-City, Hiroshima,
739-0192 Japan
Telephone Number : +81-82-420-1827
Facsimile Number : +81-82-420-1572
Contact Person : Hiroyuki Uwatoko

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

2.1 Identification of E.U.T.

Type of Equipment : Cellular Phone
Model No. : 200SH
Serial No. : Refer to Section 4, Clause 4.2
Rating : AC100-240V, DC3.7-4.0V
Receipt Date of Sample : October 13, 2012
Country of Mass-production : China
Condition of EUT : Production prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT : No Modification by the test lab

2.2 Product Description

Model No.: 200SH (referred to as the EUT in this report) is Cellular Phone.

General Specification

Clock frequency(ies) in the system : CPU: 1.512GHz (max)
RTC: 32.768kHz
Source oscillation: 19.2MHz / 27MHz (CPU) / 27.12MHz (NFC)

Radio Specification

RFID

Equipment Type	Transceiver
Frequency of Operation	13.56MHz
Type of Modulation	ASK
Antenna Type	Loop antenna
Antenna Gain	0dBi

Bluetooth (BDR/EDR)

Equipment Type	Transceiver
Frequency of Operation	2402-2480MHz
Type of Modulation	FHSS
Bandwidth & Channel spacing	1MHz & 1MHz
Antenna Type	L Type
Antenna Gain	0dBi

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Bluetooth (Low Energy)

Equipment Type	Transceiver	
Frequency of Operation	2402-2480MHz	
Type of Modulation	Digital modulation	
Bandwidth & Channel spacing	1MHz & 2MHz	
Antenna Type	L Type	
Antenna Gain	0dBi	

WLAN (IEEE802.11a/b/g/n-20)

Equipment Type	Transceiver	
Frequency of Operation	2412-2462MHz	5180-5240MHz 5260-5320MHz 5500-5700MHz
Type of Modulation	DSSS, OFDM	OFDM
Bandwidth & Channel spacing	20MHz & 5MHz	20MHz & 20MHz
Antenna Type	L Type	
Antenna Gain	0dBi	

WLAN (IEEE802.11n-40)

Equipment Type	Transceiver	
Frequency of Operation	5190-5230MHz 5270-5310MHz 5510-5670MHz	
Type of Modulation	OFDM	
Bandwidth & Channel spacing	40MHz & 40MHz	
Antenna Type	L Type	
Antenna Gain	0dBi	

GSM (PCS 1900)

Equipment Type	Transceiver	
Frequency of Operation	[Up Link] 1850 – 1910MHz [Down Link] 1930 – 1990MHz	
Type of Modulation	GMSK	
Emission Designator	249KGXW	
Antenna Type	L Type	
Antenna Gain	0dBi	

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C: 2012, final revised on August 13, 2012 and effective September 12, 2012

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits
Section 15.225 : Operation within the band 13.110-14.010MHz

* The EUT complies with FCC Part 15 Subpart B: 2012, on August 13, 2012 and effective September 12, 2012.

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted emission	ANSI C63.4:2003 7. AC powerline conducted emission measurements ----- <IC>RSS-Gen 7.2.2	Section 15.207 ----- <IC>RSS-Gen 7.2.2	N/A	N/A *1)	-
Electric Field Strength of Fundamental Emission	ANSI C63.4:2003 13. Measurement of intentional radiators ----- <IC> RSS-Gen 4.8, 4.11	Section 15.225(a) ----- <IC>RSS-210 A2.6	78.3dB, 13.56000MHz, QP, 0deg.	Complied	Radiated
Spectrum Mask	ANSI C63.4:2003 13. Measurement of intentional radiators ----- <IC>RSS-Gen 4.9, 4.11	Section 15.225(b)(c) ----- <IC> RSS-210 A2.6	46.2dB, 14.01000MHz, QP, 0deg.	Complied	Radiated
20dB Bandwidth	ANSI C63.4:2003 13. Measurement of intentional radiators ----- <IC> - *	Section15.215(c) ----- <IC> - *	See data	Complied	Radiated
Electric Field Strength of Spurious Emission	ANSI C63.4:2003 13. Measurement of intentional radiators ----- <IC>RSS-Gen 4.9, 4.11	Section15.209, Section 15.225 (d) ----- <IC>RSS-210 A2.6	0.5dB 94.920MHz, Horizontal, QP	Complied	Radiated
Frequency Tolerance	ANSI C63.4:2003 13. Measurement of intentional radiators ----- <IC>RSS-Gen 4.7	Section15.225(e) ----- <IC> RSS-210 A2.6	See data	Complied	Radiated

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

*1) The test was not performed since the NFC function does not operate with USB cable connected.

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FCC 15.31 (e)

This EUT provides stable voltage (DC4.0V) constantly to RF Module 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

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	99% Occupied Band Width	RSS-Gen 4.6.1	RSS-Gen 4.6.1	Radiated	N/A	N/A	N/A

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)	Radiated emission						
	(3m*)(±dB)				(1m*)(±dB)		(0.5m*)(±dB)
	9kHz -30MHz	30MHz - 300MHz	300MHz z -1GHz	1GHz -10GHz	10GHz -18GHz	18GHz -26.5GHz	26.5GHz -40GHz
No.1	4.3dB	5.0dB	5.1dB	4.9dB	5.8dB	4.4dB	4.3dB
No.2	4.3dB	5.2dB	5.1dB	5.0dB	5.7dB	4.3dB	4.2dB
No.3	4.6dB	5.0dB	5.1dB	5.0dB	5.7dB	4.5dB	4.2dB
No.4	4.8dB	5.2dB	5.0dB	5.0dB	5.7dB	5.2dB	4.2dB

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

Frequency counter (+)	
Normal condition	Extreme condition
7 x 10 ⁻⁶	9 x 10 ⁻⁶

Radiated emission test (3m)

The data listed in this report meets the limits unless the uncertainty is taken into consideration.

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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 Test set up, Data of EMI, and Test instruments

Refer to APPENDIX.

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

4.1 Operating Modes

Mode	Remarks
Transmitting mode (Tx) - Modulation Type A (106kbps) - Modulation Type B (106kbps) - Modulation Type F (212kbps) - Modulation Type F (424kbps)	The EUT transmits and receives at the same time, and there is no receiving mode.
The EUT was operated in a manner similar to typical use during the tests.	

Test Item	Operating mode
Electric Field Strength of Fundamental Emission *1)	Tx Mod on, without Tag, All Modulation Types
Spectrum Mask*1)	Tx Mod on, without Tag, All Modulation Types
20dB Bandwidth	Tx Mod on, with Tag / Without Tag, All Modulation Types
99% Bandwidth	Tx Mod on, with Tag / Without Tag, All Modulation Types
Electric Field Strength of Spurious Emission*1)	Tx Mod on, without Tag, Modulation Type A only *2)
Frequency Tolerance	Tx Mod on, without Tag, Modulation Type A only *2)
*1) Test was performed without Tag, as it was the worst condition compared to test with Tag.	
*2) As there is no difference due to the modulation, Modulation Type A was only tested as representative.	

Frequency Tolerance:

Temperature : -30deg.C to +50deg.C Step 10deg.C
Voltage : Normal Voltage DC 4.0V
Maximum Voltage DC 4.6V, Minimum Voltage DC 3.4V

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4.2 Configuration and peripherals



- * Test setup(s) were taken into consideration and test data was taken under worse case conditions.
- * NFC function only operates without USB and Earphone cables connected.

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Cellular Phone	200SH	004401/11441662/7	Sharp Corporation	EUT

SECTION 5: Radiated emission (Fundamental , Spurious Emission and Spectrum Mask)

Test Procedure

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 (angle of loop antenna: 0deg., 45deg., 90deg., and 135 deg.) 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	From 9kHz to 90kHz and From 110kHz to 150kHz	From 90kHz to 110kHz	From 150kHz to 490kHz	From 490kHz to 30MHz	From 30MHz to 1GHz	Above 1GHz	
Instrument used	Test Receiver					Spectrum Analyzer	
Detector	PK/AV	QP	PK/AV	QP	QP	PK	AV
IF Bandwidth	200Hz	200Hz	9kHz	9kHz	120kHz	RBW: 1MHz VBW: 3MHz	RBW: 1MHz VBW: 10Hz

- 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 carrier level and noise levels were confirmed with and without Tag, and the test was made without Tag that had the maximum noise.

* FCC Part 15 Section 15.31 (f)(2) / IC RSS-Gen 4.11 (9kHz-30MHz)

$$9\text{kHz} - 490\text{kHz} [\text{Limit at 3m}] = [\text{Limit at 300m}] - 40\log\left(\frac{3}{300}\right)$$

$$490\text{kHz} - 30\text{MHz}[\text{Limit at 3m}] = [\text{Limit at 30m}] - 40\log\left(\frac{3}{30}\right)$$

Measurement range : 0.009M-1GHz
Test data : APPENDIX
Test result : Pass

SECTION 6: Other tests

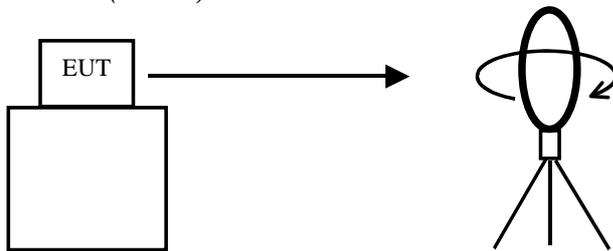
Test	Span	RBW	VBW	Sweep	Detector	Trace	Instrument used
20dB Bandwidth	30kHz	1kHz	3kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth	100kHz	1kHz	3kHz	Auto	Sample *1)	Max Hold *1)	Spectrum Analyzer
Frequency Tolerance	-	-	-	-	-	-	Frequency counter

*1) The measurement was performed with Max Hold since the duty cycle was not 100%.

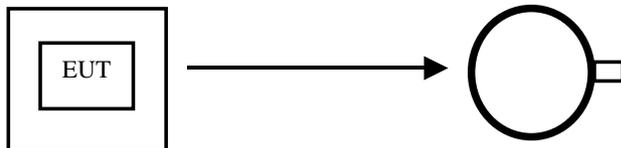
Test data : APPENDIX
Test result : Pass

Figure 1: Direction of the Loop Antenna

Side View (Vertical)

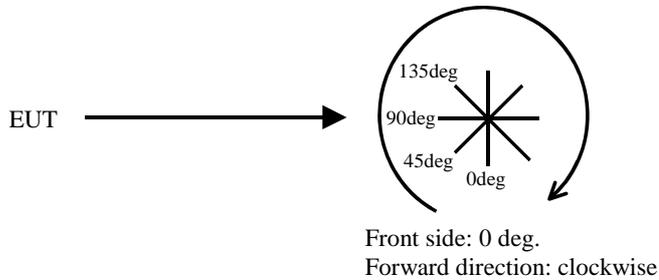


Top View (Horizontal)



Antenna was not rotated.

Top View (Vertical)



APPENDIX 1: Data of EMI test

Fundamental emission and Spectrum Mask

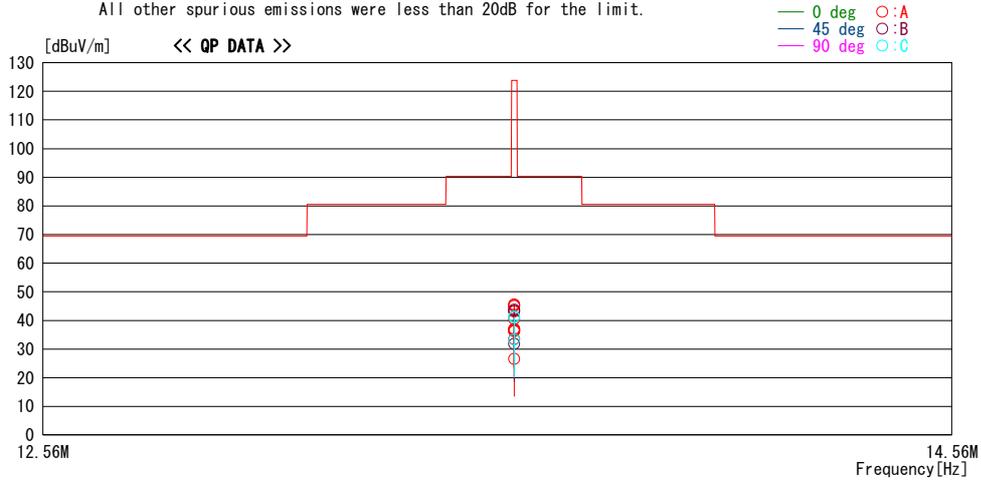
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2012/10/29

Report No. : 33CE0171-HO
Temp. / Humi. : 25deg. C / 40% RH
Engineer : Hironobu Ohnishi

Mode / Remarks : Tx 13.56MHz, Modulation TYPE F(212kbps), Worst axis: Z (without Tag)

LIMIT : FCC15.225 3m, 9-90kHz:PK, 110-490kHz:PK, other:QP
All other spurious emissions were less than 20dB for the limit.



Freq.	Reading	DET	Ant. Fac	Loss	Gain	Result	Limit	Margin	Antenna	Table	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[deg]	[deg]	
13.56000	43.0	QP	19.3	7.1	32.3	37.1	123.9	86.8	0	A	359 X
13.56000	37.7	QP	19.3	7.1	32.3	31.8	123.9	92.1	45	B	320 X
13.56000	39.2	QP	19.3	7.1	32.3	33.3	123.9	90.6	90	C	95 X
13.56000	42.7	QP	19.3	7.1	32.3	36.8	123.9	87.1	135	A	30 X
13.56000	42.1	QP	19.3	7.1	32.3	36.2	123.9	87.7	0	A	2 X Loop: Hori.
13.56000	51.0	QP	19.3	7.1	32.3	45.1	123.9	78.8	0	A	179 Y
13.56000	49.2	QP	19.3	7.1	32.3	43.3	123.9	80.6	45	B	147 Y
13.56000	47.0	QP	19.3	7.1	32.3	41.1	123.9	82.8	90	C	94 Y
13.56000	49.0	QP	19.3	7.1	32.3	43.1	123.9	80.8	135	A	29 Y
13.56000	42.2	QP	19.3	7.1	32.3	36.3	123.9	87.6	0	A	359 Y Loop: Hori.
13.56000	51.5	QP	19.3	7.1	32.3	45.6	123.9	78.3	0	A	172 Z *
13.56000	49.6	QP	19.3	7.1	32.3	43.7	123.9	80.2	45	B	145 Z
13.56000	47.2	QP	19.3	7.1	32.3	41.3	123.9	82.6	90	C	89 Z
13.56000	39.4	QP	19.3	7.1	32.3	33.5	123.9	90.4	135	A	198 Z
13.56000	51.1	QP	19.3	7.1	32.3	45.2	123.9	78.7	180	A	173 Z
13.56000	42.4	QP	19.3	7.1	32.3	36.5	123.9	87.4	0	A	160 Z Loop: Hori.
13.56000	32.5	QP	19.3	7.1	32.3	26.6	123.9	97.3	0	A	268 Z withTag d=0mm
13.56000	46.3	QP	19.3	7.1	32.3	40.4	123.9	83.5	0	A	169 Z withTag d=30mm

CHART: WITH FACTOR, ANT TYPE: LOOP Except for the data below: adequate margin data below the limits.
CALCULATION: RESULT = READING + ANT FACTOR + LOSS(CABLE + ATTEN.) - GAIN(AMP.)

Fundamental emission and Spectrum Mask

DATA OF RADIATED EMISSION TEST

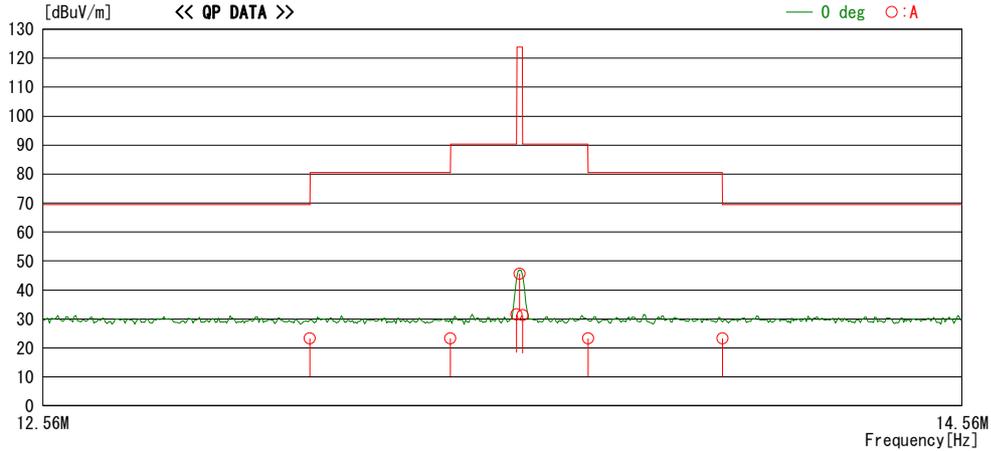
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2012/10/30

Report No. : 33CE0171-HO

Temp./ Humi. : 25deg. C / 40% RH
Engineer : Hironobu Ohnishi

Mode / Remarks : Tx 13.56MHz, Modulation TYPE A(106kbps), Worst axis: Z (without Tag)

LIMIT : FCC15.225 3m, 9-90kHz:PK, 110-490kHz:PK, other:QP
All other spurious emissions were less than 20dB for the limit.



Freq. [MHz]	Reading [dBuV]	DET	Ant. Fac	Loss	Gain	Result	Limit	Margin	Antenna	Table	Comment
			[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[deg]	[deg]	
13.11000	29.2	QP	19.3	7.0	32.3	23.2	69.5	46.3	0	A	172
13.41000	29.2	QP	19.3	7.0	32.3	23.2	80.5	57.3	0	A	172
13.55300	37.4	QP	19.3	7.1	32.3	31.5	90.4	58.9	0	A	172
13.56000	51.5	QP	19.3	7.1	32.3	45.6	123.9	78.3	0	A	172
13.56700	37.2	QP	19.3	7.1	32.3	31.3	90.4	59.1	0	A	172
13.71000	29.2	QP	19.3	7.1	32.3	23.3	80.5	57.2	0	A	172
14.01000	29.1	QP	19.3	7.1	32.3	23.2	69.5	46.3	0	A	172

CHART: WITH FACTOR, ANT TYPE: LOOP Except for the data below : adequate margin data below the limits.
CALCULATION : RESULT = READING + ANT FACTOR + LOSS(CABLE + ATTEN.) - GAIN(AMP.)

Fundamental emission and Spectrum Mask

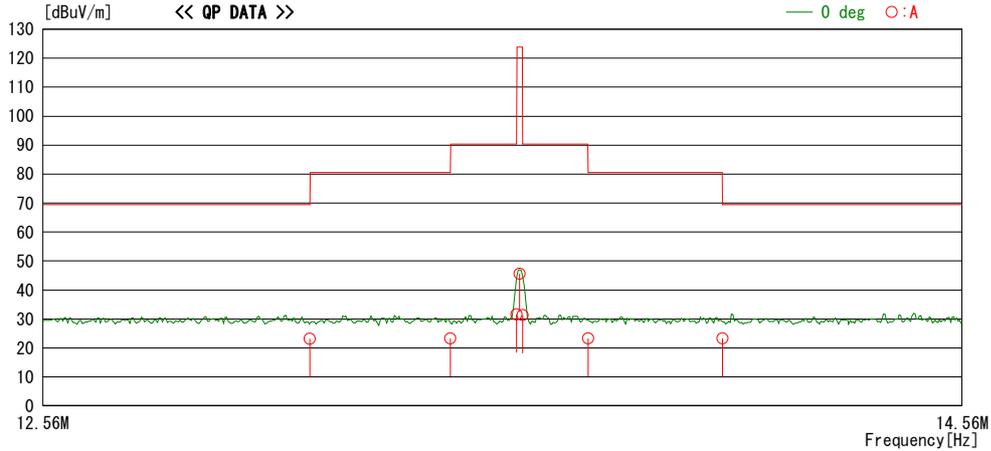
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2012/10/30

Report No. : 33CE0171-HO
Temp./ Humi. : 25deg. C / 40% RH
Engineer : Hironobu Ohnishi

Mode / Remarks : Tx 13.56MHz, Modulation TYPE B(106kbps), Worst axis: Z (without Tag)

LIMIT : FCC15.225 3m, 9-90kHz:PK, 110-490kHz:PK, other:QP
All other spurious emissions were less than 20dB for the limit.



Freq. [MHz]	Reading [dBuV]	DET	Ant. Fac	Loss	Gain	Result	Limit	Margin	Antenna	Table	Comment
			[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[deg]	[deg]	
13.11000	29.1	QP	19.3	7.0	32.3	23.1	69.5	46.4	0	A	172
13.41000	29.2	QP	19.3	7.0	32.3	23.2	80.5	57.3	0	A	172
13.55300	37.4	QP	19.3	7.1	32.3	31.5	90.4	58.9	0	A	172
13.56000	51.5	QP	19.3	7.1	32.3	45.6	123.9	78.3	0	A	172
13.56700	37.2	QP	19.3	7.1	32.3	31.3	90.4	59.1	0	A	172
13.71000	29.1	QP	19.3	7.1	32.3	23.2	80.5	57.3	0	A	172
14.01000	29.1	QP	19.3	7.1	32.3	23.2	69.5	46.3	0	A	172

CHART: WITH FACTOR, ANT TYPE: LOOP Except for the data below : adequate margin data below the limits.
CALCULATION : RESULT = READING + ANT FACTOR + LOSS(CABLE + ATTEN.) - GAIN(AMP.)

Fundamental emission and Spectrum Mask

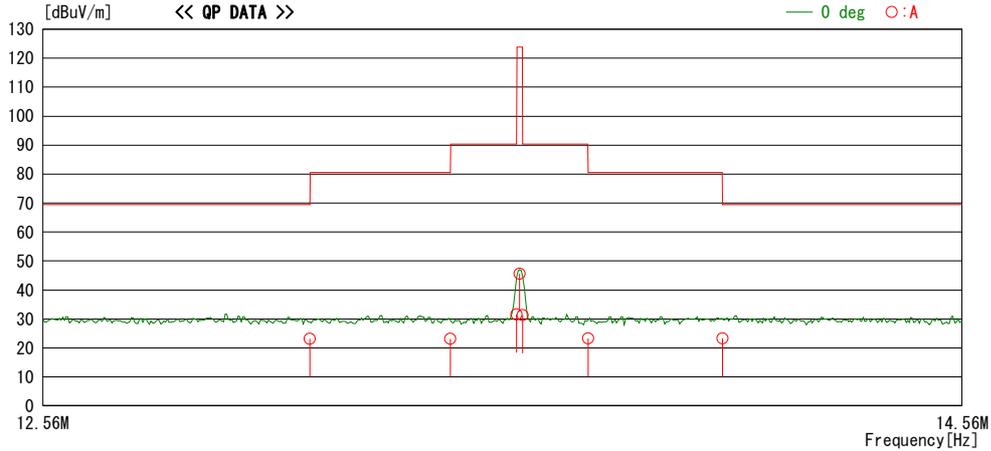
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2012/10/30

Report No. : 33CE0171-HO
Temp./ Humi. : 25deg. C / 40% RH
Engineer : Hironobu Ohnishi

Mode / Remarks : Tx 13.56MHz, Modulation TYPE F(212kbps), Worst axis: Z (without Tag)

LIMIT : FCC15.225 3m, 9-90kHz:PK, 110-490kHz:PK, other:QP
All other spurious emissions were less than 20dB for the limit.



Freq. [MHz]	Reading [dBuV]	DET	Ant. Fac	Loss	Gain	Result	Limit	Margin	Antenna	Table	Comment
			[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[deg]	[deg]	
13.11000	29.1	QP	19.3	7.0	32.3	23.1	69.5	46.4	0	A	172
13.41000	29.1	QP	19.3	7.0	32.3	23.1	80.5	57.4	0	A	172
13.55300	37.4	QP	19.3	7.1	32.3	31.5	90.4	58.9	0	A	172
13.56000	51.5	QP	19.3	7.1	32.3	45.6	123.9	78.3	0	A	172
13.56700	37.2	QP	19.3	7.1	32.3	31.3	90.4	59.1	0	A	172
13.71000	29.2	QP	19.3	7.1	32.3	23.3	80.5	57.2	0	A	172
14.01000	29.2	QP	19.3	7.1	32.3	23.3	69.5	46.2	0	A	172

CHART: WITH FACTOR, ANT TYPE: LOOP Except for the data below : adequate margin data below the limits.
CALCULATION : RESULT = READING + ANT FACTOR + LOSS(CABLE + ATTEN.) - GAIN(AMP.)

Fundamental emission and Spectrum Mask

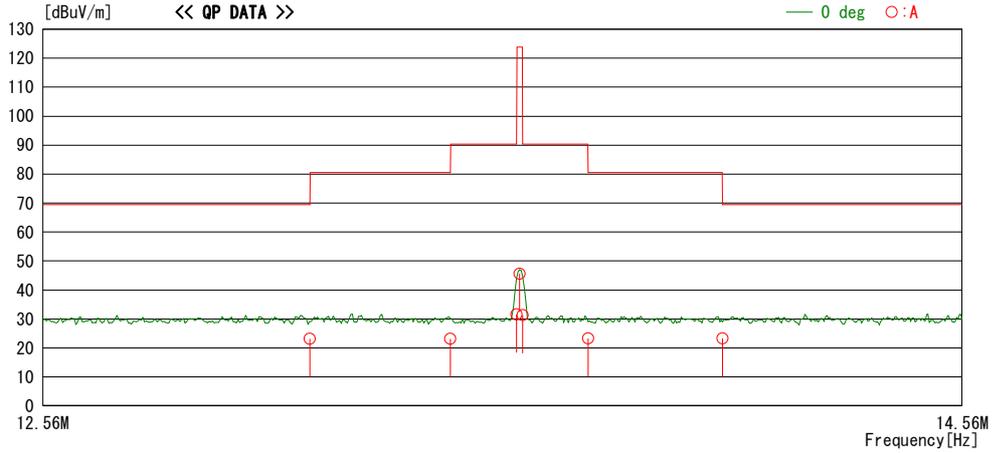
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2012/10/30

Report No. : 33CE0171-HO
Temp./ Humi. : 25deg. C / 40% RH
Engineer : Hironobu Ohnishi

Mode / Remarks : Tx 13.56MHz, Modulation TYPE F(424kbps), Worst axis: Z (without Tag)

LIMIT : FCC15.225 3m, 9-90kHz:PK, 110-490kHz:PK, other:QP
All other spurious emissions were less than 20dB for the limit.



Freq. [MHz]	Reading [dBuV]	DET	Ant. Fac	Loss	Gain	Result	Limit	Margin	Antenna	Table	Comment
			[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[deg]	[deg]	
13.11000	29.1	QP	19.3	7.0	32.3	23.1	69.5	46.4	0	A	172
13.41000	29.1	QP	19.3	7.0	32.3	23.1	80.5	57.4	0	A	172
13.55300	37.4	QP	19.3	7.1	32.3	31.5	90.4	58.9	0	A	172
13.56000	51.5	QP	19.3	7.1	32.3	45.6	123.9	78.3	0	A	172
13.56700	37.2	QP	19.3	7.1	32.3	31.3	90.4	59.1	0	A	172
13.71000	29.2	QP	19.3	7.1	32.3	23.3	80.5	57.2	0	A	172
14.01000	29.1	QP	19.3	7.1	32.3	23.2	69.5	46.3	0	A	172

CHART: WITH FACTOR, ANT TYPE: LOOP Except for the data below : adequate margin data below the limits.
CALCULATION : RESULT = READING + ANT FACTOR + LOSS(CABLE + ATTEN.) - GAIN(AMP.)

Spurious emission

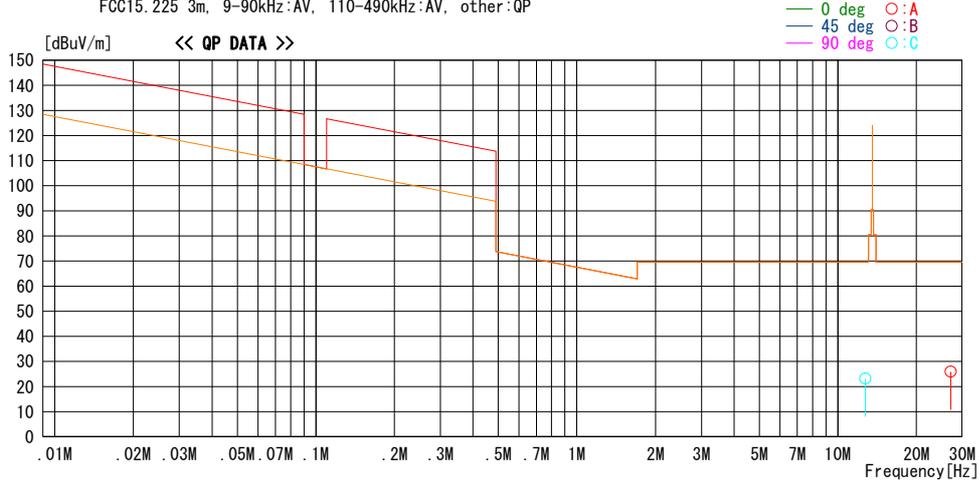
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2012/10/30

Report No. : 33CE0171-HO
Temp./ Humi. : 25deg. C / 40% RH
Engineer : Hironobu Ohnishi

Mode / Remarks : Tx 13.56MHz, Modulation TYPE A(106kbps), Worst axis: Z (without Tag)

LIMIT : FCC15.225 3m, 9-90kHz:PK, 110-490kHz:PK, other:QP
FCC15.225 3m, 9-90kHz:AV, 110-490kHz:AV, other:QP



Freq. [MHz]	Reading [dBuV]	DET	Ant. Fac	Loss	Gain	Result	Limit	Margin	Antenna	Table	Comment
			[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[deg]	[deg]	
12.73600	29.2	QP	19.3	7.0	32.3	23.2	69.5	46.3	90	C	359
27.12000	29.8	QP	20.9	7.5	32.2	26.0	69.5	43.5	0	A	175

CHART: WITH FACTOR, ANT TYPE: LOOP Except for the data below : adequate margin data below the limits.
CALCULATION : RESULT = READING + ANT FACTOR + LOSS(CABLE + ATTEN.) - GAIN (AMP.)

Spurious emission

DATA OF RADIATED EMISSION TEST

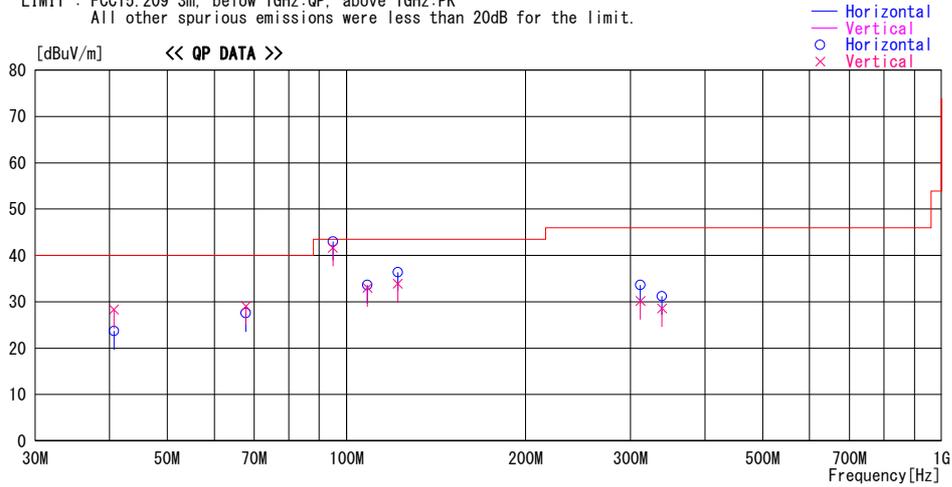
UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2012/10/30

Report No. : 33CE0171-HO

Temp./Humi. : 21deg. C / 38% RH
Engineer : Katsunori Okai

Mode / Remarks : Tx 13.56MHz, Modulation TYPE A(106kbps), Worst axis[Hori: Y-axis, Ver: Z-axis]

LIMIT : FCC15.209 3m, below 1GHz:QP, above 1GHz:PK
All other spurious emissions were less than 20dB for the limit.



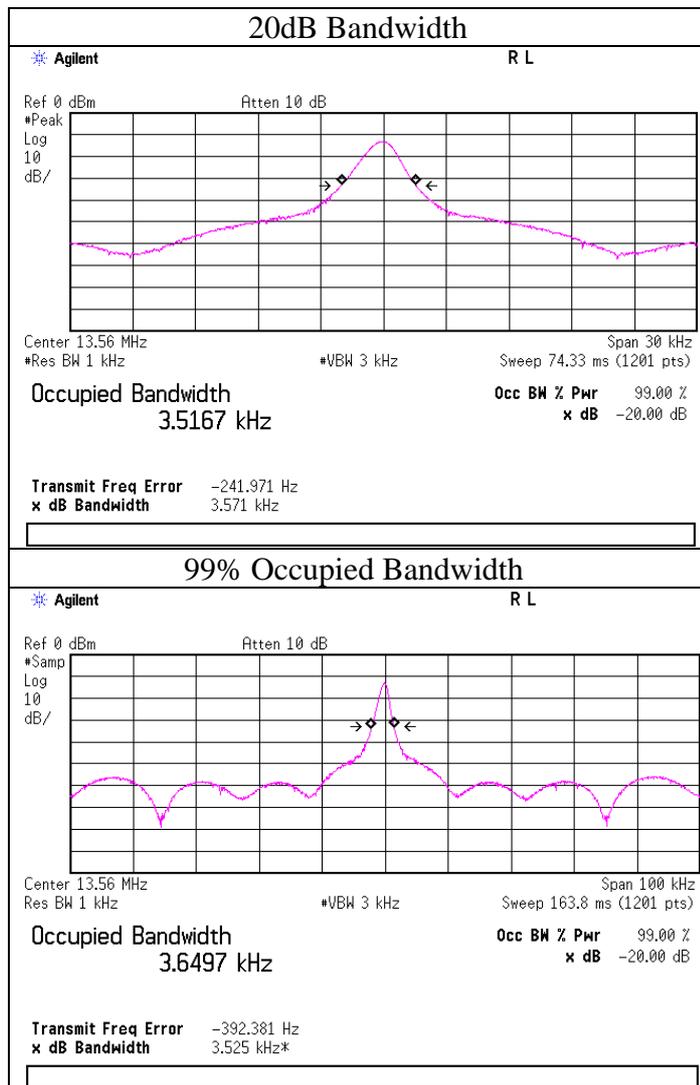
Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss &	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Gain [dB]							
40.680	31.2	QP	14.2	-21.7	23.7	182	278	Hori.	40.0	16.3	
40.680	35.8	QP	14.2	-21.7	28.3	249	100	Vert.	40.0	11.7	
67.800	42.1	QP	6.8	-21.3	27.6	236	294	Hori.	40.0	12.4	
67.800	43.6	QP	6.8	-21.3	29.1	33	100	Vert.	40.0	10.9	
94.920	53.6	QP	9.1	-21.0	41.7	183	100	Vert.	43.5	1.8	
94.920	54.9	QP	9.1	-21.0	43.0	271	189	Hori.	43.5	0.5	
108.480	43.0	QP	11.3	-20.7	33.6	271	269	Hori.	43.5	9.9	
108.480	42.4	QP	11.3	-20.7	33.0	1	100	Vert.	43.5	10.5	
122.040	41.3	QP	13.1	-20.5	33.9	187	100	Vert.	43.5	9.6	
122.040	43.8	QP	13.1	-20.5	36.4	276	163	Hori.	43.5	7.1	
311.880	38.0	QP	14.4	-18.8	33.6	285	100	Hori.	46.0	12.4	
311.880	34.6	QP	14.4	-18.8	30.2	355	200	Vert.	46.0	15.8	
339.000	34.6	QP	15.4	-18.8	31.2	215	100	Hori.	46.0	14.8	
339.000	32.0	QP	15.4	-18.8	28.6	351	181	Vert.	46.0	17.4	

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)

20dB Bandwidth and 99% Occupied Bandwidth

Test place	Head Office EMC Lab. No.7 Shielded Room
Report No.	33CE0171-HO
Date	11/01/2012
Temperature/ Humidity	24deg. C / 37% RH
Engineer	Yutaka Yoshida
Mode	Tx Mod on without Tag (Type A:106kbps)

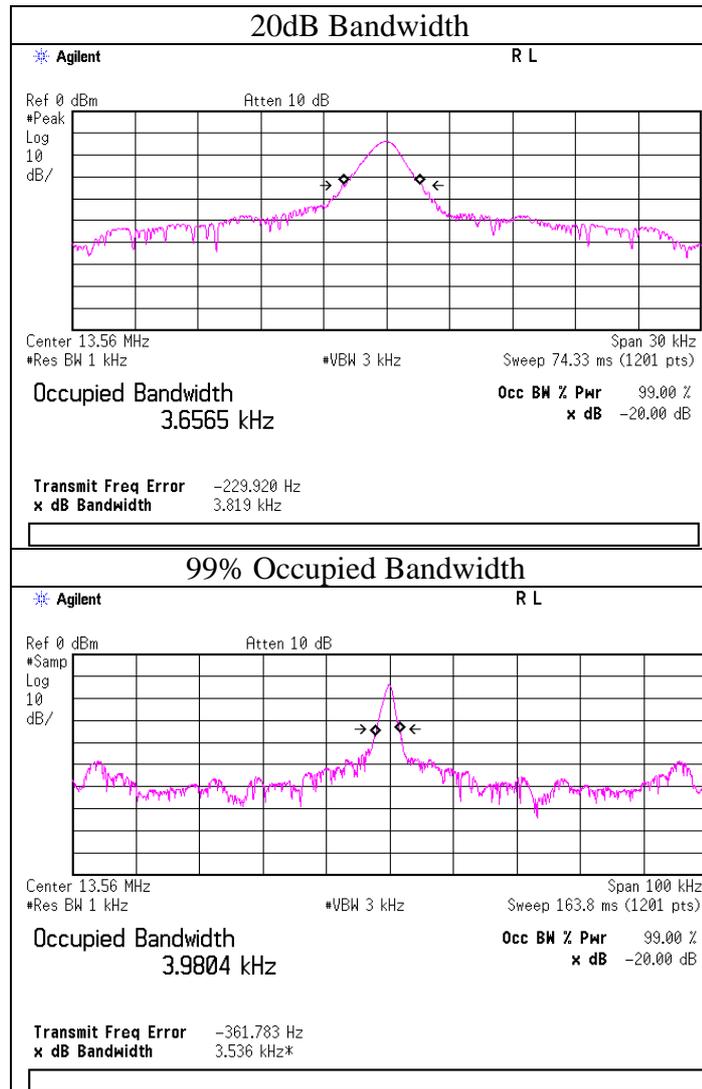
FREQ [MHz]	20dB Bandwidth [kHz]	99% Occupied Bandwidth [kHz]
13.56	3.57	3.65



20dB Bandwidth and 99% Occupied Bandwidth

Test place	Head Office EMC Lab. No.7 Shielded Room
Report No.	33CE0171-HO
Date	11/02/2012
Temperature/ Humidity	22deg. C / 36% RH
Engineer	Yutaka Yoshida
Mode	Tx Mod on with Tag (Type A:106kbps)

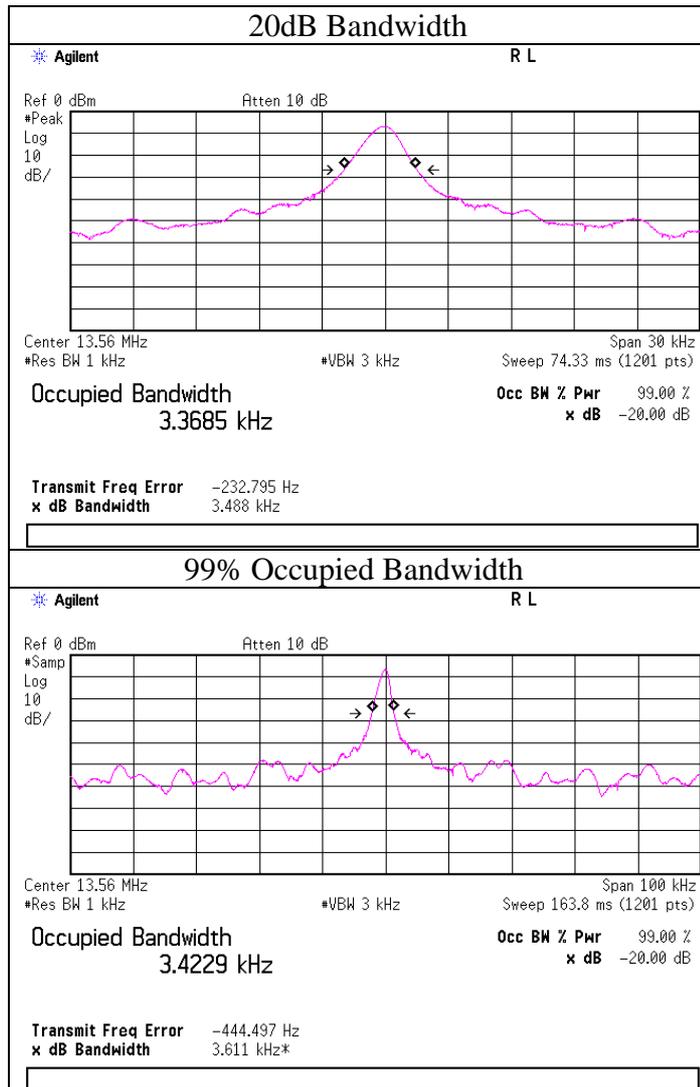
FREQ [MHz]	20dB Bandwidth [kHz]	99% Occupied Bandwidth [kHz]
13.56	3.82	3.98



20dB Bandwidth and 99% Occupied Bandwidth

Test place	Head Office EMC Lab. No.7 Shielded Room
Report No.	33CE0171-HO
Date	11/02/2012
Temperature/ Humidity	22deg. C / 36% RH
Engineer	Yutaka Yoshida
Mode	Tx Mod on without Tag (Type B:106kbps)

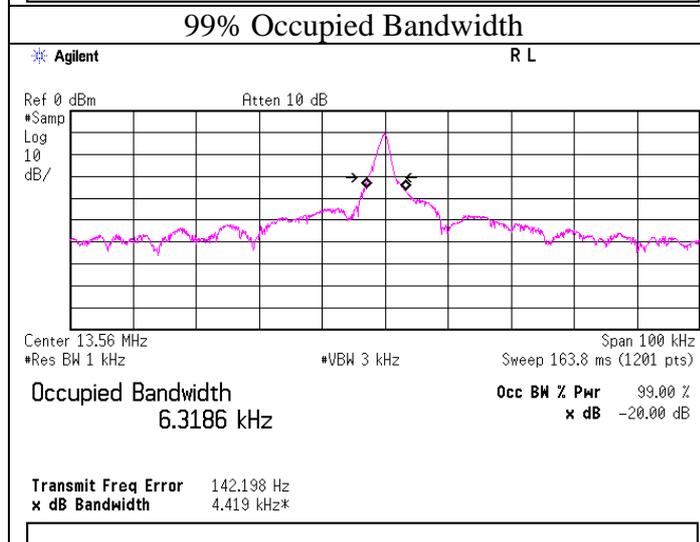
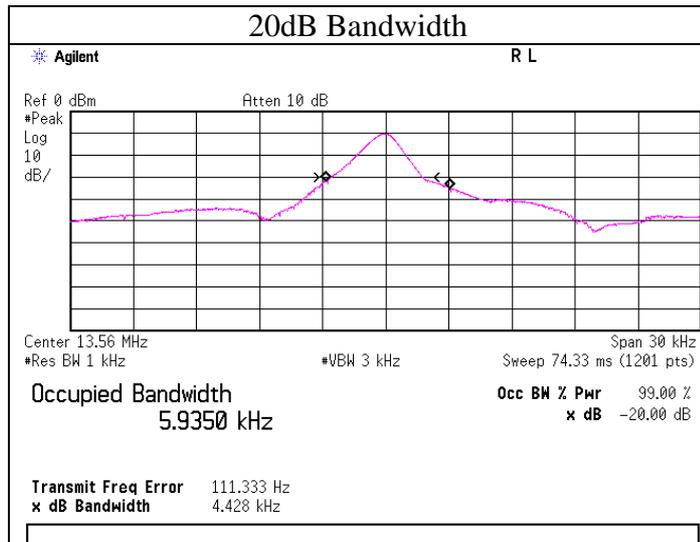
FREQ [MHz]	20dB Bandwidth [kHz]	99% Occupied Bandwidth [kHz]
13.56	3.49	3.42



20dB Bandwidth and 99% Occupied Bandwidth

Test place	Head Office EMC Lab. No.7 Shielded Room
Report No.	33CE0171-HO
Date	11/02/2012
Temperature/ Humidity	22deg. C / 36% RH
Engineer	Yutaka Yoshida
Mode	Tx Mod on with Tag (Type B:106kbps)

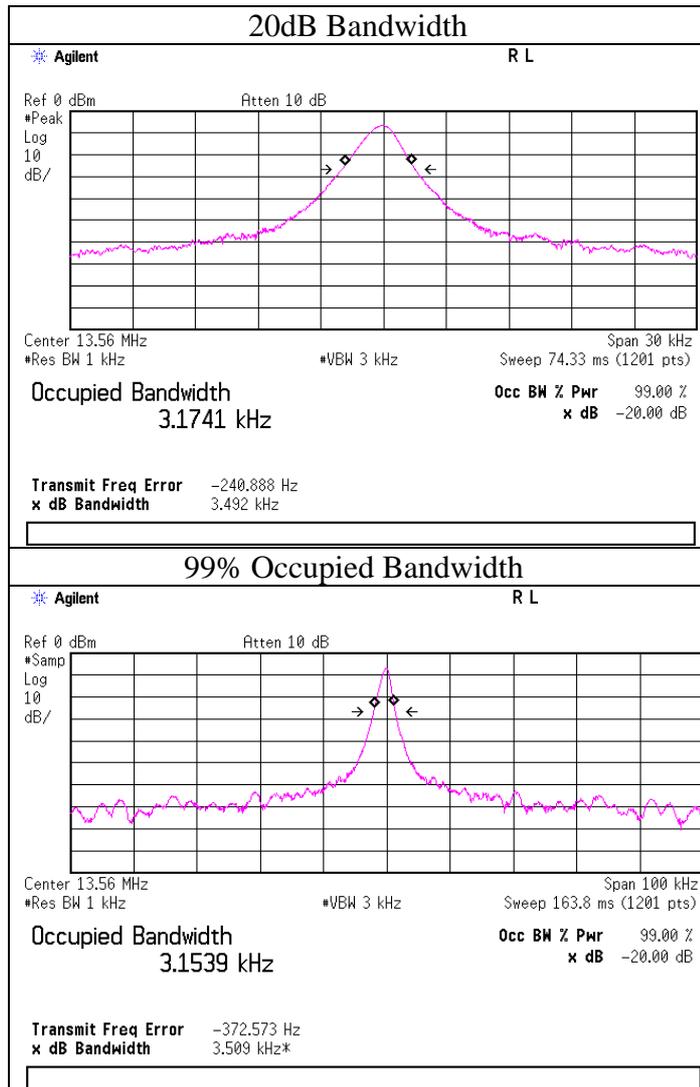
FREQ [MHz]	20dB Bandwidth [kHz]	99% Occupied Bandwidth [kHz]
13.56	4.43	6.32



20dB Bandwidth and 99% Occupied Bandwidth

Test place	Head Office EMC Lab. No.7 Shielded Room
Report No.	33CE0171-HO
Date	11/02/2012
Temperature/ Humidity	22deg. C / 36% RH
Engineer	Yutaka Yoshida
Mode	Tx Mod on without Tag (Type F:212kbps)

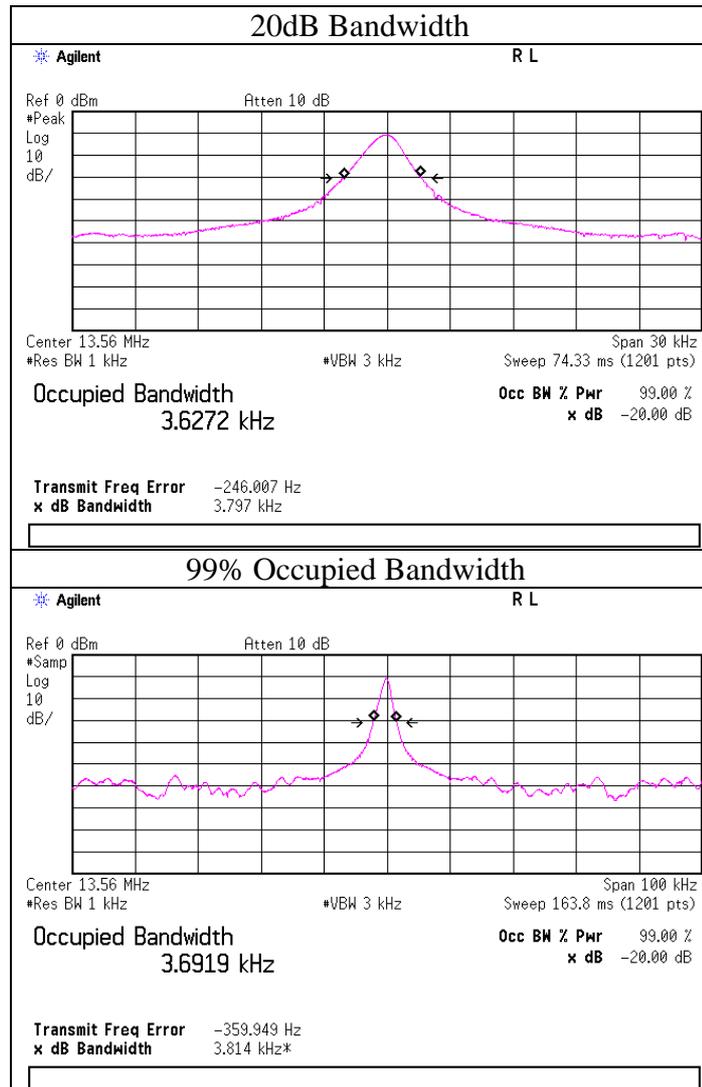
FREQ [MHz]	20dB Bandwidth [kHz]	99% Occupied Bandwidth [kHz]
13.56	3.49	3.15



20dB Bandwidth and 99% Occupied Bandwidth

Test place	Head Office EMC Lab. No.7 Shielded Room
Report No.	33CE0171-HO
Date	11/02/2012
Temperature/ Humidity	22deg. C / 36% RH
Engineer	Yutaka Yoshida
Mode	Tx Mod on with Tag (Type F:212kbps)

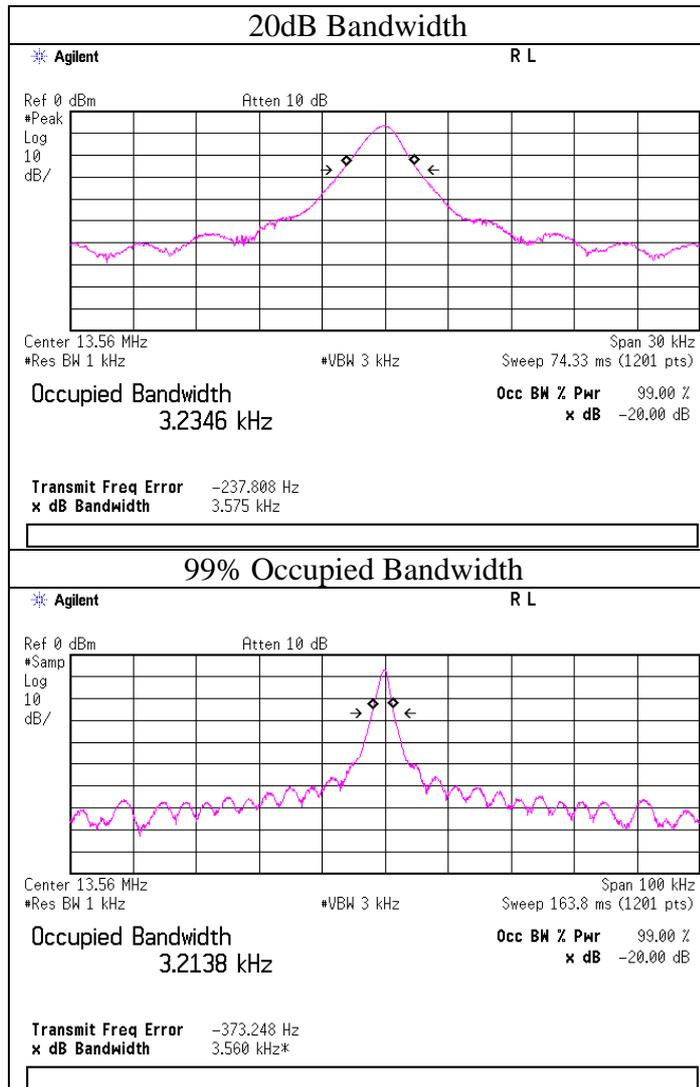
FREQ [MHz]	20dB Bandwidth [kHz]	99% Occupied Bandwidth [kHz]
13.56	3.80	3.69



20dB Bandwidth and 99% Occupied Bandwidth

Test place	Head Office EMC Lab. No.7 Shielded Room
Report No.	33CE0171-HO
Date	11/02/2012
Temperature/ Humidity	22deg. C / 36% RH
Engineer	Yutaka Yoshida
Mode	Tx Mod on without Tag (Type F:424kbps)

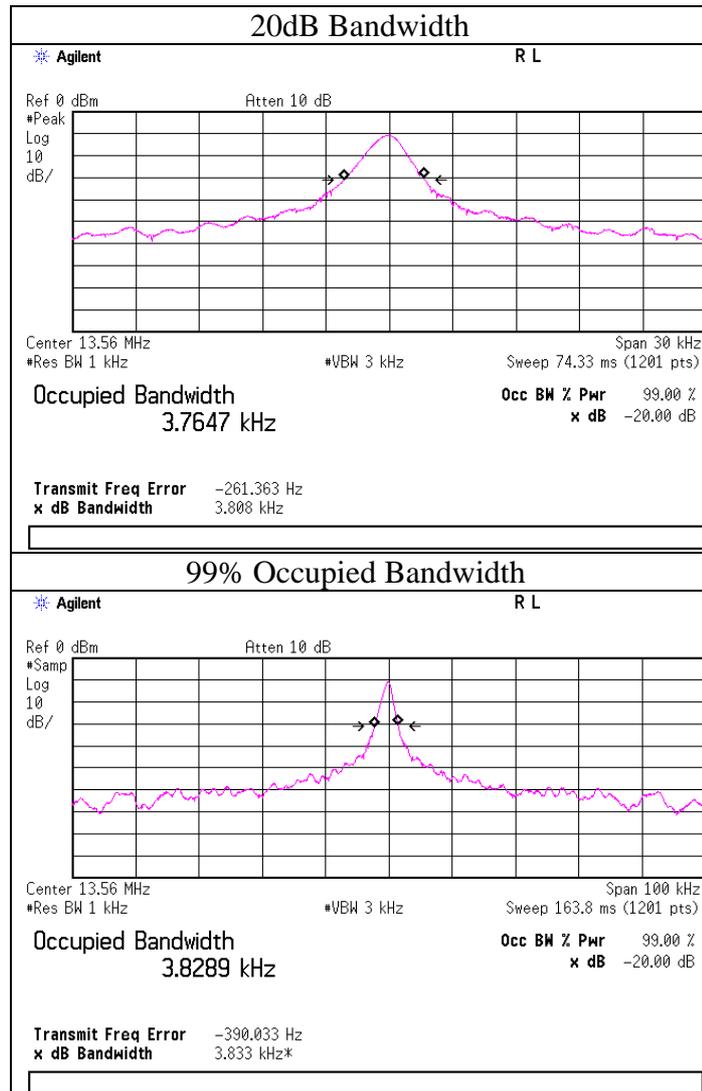
FREQ [MHz]	20dB Bandwidth [kHz]	99% Occupied Bandwidth [kHz]
13.56	3.58	3.21



20dB Bandwidth and 99% Occupied Bandwidth

Test place	Head Office EMC Lab. No.7 Shielded Room
Report No.	33CE0171-HO
Date	11/02/2012
Temperature/ Humidity	22deg. C / 36% RH
Engineer	Yutaka Yoshida
Mode	Tx Mod on with Tag (Type F:424kbps)

FREQ [MHz]	20dB Bandwidth [kHz]	99% Occupied Bandwidth [kHz]
13.56	3.81	3.83



Frequency Tolerance

Test place Head Office EMC Lab. No.7 Shielded room
Report No. 33CE0171-HO
Date 11/01/2012
Temperature/ Humidity 24 deg. C/ 37% RH
Engineer Yutaka Yoshida
Mode Tx Mod on without tag (Type A)

Test Condition deg.C	Volts	Test Timing	Measured freq [MHz]	Freq error [MHz]	Result [ppm]	Limit (+/- 0.01%) [+/- ppm]	Margin [ppm]
20deg.C	3.4V	Power on	13.55927480	-0.00072520	-53.48	100.00	46.52
		on 2min.	13.55929820	-0.00070180	-51.76	100.00	48.24
		on 5min.	13.55930200	-0.00069800	-51.47	100.00	48.53
		on 10min.	13.55930000	-0.00070000	-51.62	100.00	48.38
	4.0V	Power on	13.55907500	-0.00092500	-68.22	100.00	31.78
		on 2min.	13.55907130	-0.00092870	-68.49	100.00	31.51
		on 5min.	13.55917000	-0.00083000	-61.21	100.00	38.79
		on 10min.	13.55905940	-0.00094060	-69.37	100.00	30.63
	4.6V	Power on	13.55931410	-0.00068590	-50.58	100.00	49.42
		on 2min.	13.55932490	-0.00067510	-49.79	100.00	50.21
		on 5min.	13.55933240	-0.00066760	-49.23	100.00	50.77
		on 10min.	13.55931860	-0.00068140	-50.25	100.00	49.75
50deg.C.	4.0V	Power on	13.55889500	-0.00110500	-81.49	100.00	18.51
		on 2min.	13.55888920	-0.00111080	-81.92	100.00	18.08
		on 5min.	13.55888890	-0.00111110	-81.94	100.00	18.06
		on 10min.	13.55888370	-0.00111630	-82.32	100.00	17.68
40deg.C.	4.0V	Power on	13.55893770	-0.00106230	-78.34	100.00	21.66
		on 2min.	13.55893590	-0.00106410	-78.47	100.00	21.53
		on 5min.	13.55893530	-0.00106470	-78.52	100.00	21.48
		on 10min.	13.55892620	-0.00107380	-79.19	100.00	20.81
30deg.C.	4.0V	Power on	13.55917120	-0.00082880	-61.12	100.00	38.88
		on 2min.	13.55916810	-0.00083190	-61.35	100.00	38.65
		on 5min.	13.55916450	-0.00083550	-61.62	100.00	38.38
		on 10min.	13.55916290	-0.00083710	-61.73	100.00	38.27
20deg.C.	4.0V	Power on	13.55907500	-0.00092500	-68.22	100.00	31.78
		on 2min.	13.55907130	-0.00092870	-68.49	100.00	31.51
		on 5min.	13.55917000	-0.00083000	-61.21	100.00	38.79
		on 10min.	13.55905940	-0.00094060	-69.37	100.00	30.63
10deg.C.	4.0V	Power on	13.55941950	-0.00058050	-42.81	100.00	57.19
		on 2min.	13.55942100	-0.00057900	-42.70	100.00	57.30
		on 5min.	13.55941430	-0.00058570	-43.19	100.00	56.81
		on 10min.	13.55940930	-0.00059070	-43.56	100.00	56.44
0deg.C.	4.0V	Power on	13.55946720	-0.00053280	-39.29	100.00	60.71
		on 2min.	13.55945550	-0.00054450	-40.15	100.00	59.85
		on 5min.	13.55945670	-0.00054330	-40.07	100.00	59.93
		on 10min.	13.55945440	-0.00054560	-40.24	100.00	59.76
-10deg.C.	4.0V	Power on	13.55952390	-0.00047610	-35.11	100.00	64.89
		on 2min.	13.55953070	-0.00046930	-34.61	100.00	65.39
		on 5min.	13.55953300	-0.00046700	-34.44	100.00	65.56
		on 10min.	13.55954530	-0.00045470	-33.53	100.00	66.47
-20deg.C.	4.0V	Power on	13.55952570	-0.00047430	-34.98	100.00	65.02
		on 2min.	13.55951820	-0.00048180	-35.53	100.00	64.47
		on 5min.	13.55952010	-0.00047990	-35.39	100.00	64.61
		on 10min.	13.55951130	-0.00048870	-36.04	100.00	63.96
-30deg.C.	4.0V	Power on	13.55949570	-0.00050430	-37.19	100.00	62.81
		on 2min.	13.55951480	-0.00048520	-35.78	100.00	64.22
		on 5min.	13.55951050	-0.00048950	-36.10	100.00	63.90
		on 10min.	13.55951740	-0.00048260	-35.59	100.00	64.41

Limit : 13.56 13.56 MHz +/-0.01 % (+/- 100ppm) = +/- 0.001356 MHz

APPENDIX 2: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE	2012/06/29 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE	2012/02/06 * 12
MJM-14	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MRENT-95	Spectrum Analyzer	Agilent	E4440A	MY46185823	RE	2012/06/19 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE	2012/04/03 * 12
MLPA-01	Loop Antenna	Rohde & Schwarz	HFH2-Z2	100017	RE	2012/10/12 * 12
MCC-143	Coaxial Cable	UL Japan	-	-	RE	2012/07/27 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2011/11/02 * 12
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	260834	RE	2012/03/16 * 12
MCC-13	Coaxial Cable	Fujikura	3D-2W(12m)/5D-2W(5m)/5D-2W(0.8m)/5D-2W(1m)	-	RE	2012/02/16 * 12
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	VHA9103200 8	RE	2012/10/08 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	201	RE	2012/10/08 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	-	RE	2012/02/16 * 12
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2012/09/11 * 12
MSA-06	Spectrum Analyzer	Agilent	E4407B	MY45107638	FT/BW	2012/04/04 * 12
MCH-06	Temperature and Humidity Chamber	Tabai Espec	PL-1KT	14007630	FT	2012/04/20 * 12
MOS-04	Digital Humidity Indicator	N.T	NT-1800	MOS04	FT/BW	2012/02/06 * 12
MMM-16	DIGITAL HiTESTER	Hioki	3805	070900532	FT/BW	2012/01/13 * 12
MFC-01	Microwave Counter	Advantest	R5373	120100309	FT	2012/08/16 * 12
MLPA-06	Loop Antenna	UL Japan	-	-	FT/BW	Pre Check
MDPS-20	REGULATED DC POWER SUPPLY	TEXIO	PW16-5ADP	171116437	FT/BW	Pre Check
MCC-144	Microwave Cable	Junkosha	MWX221	1207S407	FT/BW	2012/08/03 * 12

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

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

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

Test Item: RE: Radiated Emission
FT: Frequency Tolerance
BW: 20dB Bandwidth, 99% Occupied Bandwidth

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Facsimile : +81 596 24 8124