



**FCC CFR47 PART 22 SUBPART H  
FCC CFR47 PART 24 SUBPART E**

**WWAN**

**CERTIFICATION TEST REPORT**

**FOR**

**RMCU-FMS**

**MODEL NUMBER : FMS-HF1**

**FCC ID: ZE8-FMS-HF1**

**REPORT NUMBER: 4788243069-E2V4**

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*Prepared for*  
**KYUNGWOO SYSTECH INC.**  
**#401, Daeryung Post Tower 5, 68, Digital-ro 9,**  
**Geumcheon-gu, Seoul, South Korea**

*Prepared by*  
**UL Korea, Ltd.**  
**26th floor, 152, Teheran-ro, Gangnam-gu Seoul, 06236, Korea**

**Suwon Test Site: UL Korea, Ltd. Suwon Laboratory**  
**218 Maeyeong-ro, Yeongtong-gu,**  
**Suwon-si, Gyeonggi-do, 16675, Korea**  
**TEL: (031) 337-9902**  
**FAX: (031) 213-5433**



**TL-637**

Revision History

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V1	01/31/18	Initial issue	Hyunsik Yun
V2	02/07/18	Revised missed typo	Hyunsik Yun
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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** KYUNGWOO SYSTECH INC.  
**EUT DESCRIPTION:** RMCU-FMS  
**MODEL NUMBER:** FMS-HF1  
**SERIAL NUMBER:** Prototype  
**DATE TESTED:** DEC 18, 2017 - DEC 22, 2017

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 22H and 24E	Pass

UL Korea, Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Korea, Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Korea, Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Korea, Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by IAS, any agency of the Federal Government, or any agency of any government.

Approved & Released For  
UL Korea, Ltd. By:



SungGil Park  
Suwon Lab Engineer  
UL Korea, Ltd.

Tested By:



Hyunsik Yun  
Laboratory Engineer  
UL Korea, Ltd.

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with following methods.

1. FCC CFR 47 Part 2.
2. FCC CFR 47 Part 22.
3. FCC CFR 47 Part 24.
4. ANSI TIA-603-E.
5. KDB 971168 D01 Power Meas License Digital Systems v03

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea. Line conducted emissions are measured only at the 218 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

218 Maeyeong-ro	
<input type="checkbox"/>	Chamber 1
<input checked="" type="checkbox"/>	Chamber 2

UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637. The full scope of accreditation can be viewed at <http://www.iasonline.org/PDF/TL/TL-637.pdf>.

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

### 4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$EIRP = \text{PSA reading with EUT worst orientation (dBm)} + \text{Path loss (dB)} - \text{cable loss (between the SG and substitution antenna)} + \text{Substitution Antenna Factor (dBi)}$

$ERP = \text{PSA reading with EUT worst orientation (dBm)} + \text{Path loss (dB)} - \text{cable loss (between the SG and substitution antenna)}$

(Path loss = Signal generator output – PSA reading with substitution antenna)

### 4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	2.32 dB
Radiated Disturbance, Below 1GHz	3.86 dB
Radiated Disturbance, Above 1 GHz	5.97 dB

Uncertainty figures are valid to a confidence level of 95%.

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT has GSM/WCDMA, DTS b/g/n and RFID functions.  
 This test report addresses the WWAN operational mode.

### 5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted and radiated ERP / EIRP output powers as follows:

Note : Conducted output power results were excerpted from GSM/WCDMA test report.  
 (Test report No. 6-0082-11-1-2a / 6-0082-11-1-2a)

#### GSM

FCC Part 22/24						
Band	Frequency Range	Modulation	Conducted		Radiated	
	[MHz]		Avg [dBm]	Avg [mW]	Peak [dBm]	Peak [mW]
GSM850	824~849	GPRS	32.67	1849.27	30.70	1174.90
GSM1900	1850~1910	GPRS	30.27	1064.14	32.04	1599.56

#### WCDMA

FCC Part 22/24						
Band	Frequency Range	Modulation	Conducted		Radiated	
	[MHz]		Avg [dBm]	Avg [mW]	Peak [dBm]	Peak [mW]
Band 5	824~849	REL99	23.15	206.54	21.47	140.28
Band 2	1850~1910	REL99	23.73	236.05	28.77	753.36

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a internal antenna for the [List the bands supported] with a maximum peak gain as follow:

Frequency (MHz)	Peak Gain (dBi)
GSM850 / WCDMA Band 5 / LTE Band 5 824 ~ 849 MHz	2.72
GSM1900 / WCDMA Band 2 / LTE Band 2 1850 ~ 1910 MHz	3.86

### 5.4. DESCRIPTION OF TEST SETUP

#### SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
N/A	N/A	N/A	N/A	N/A

#### I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	Fixed	Non-shielded	0.8m	N/A

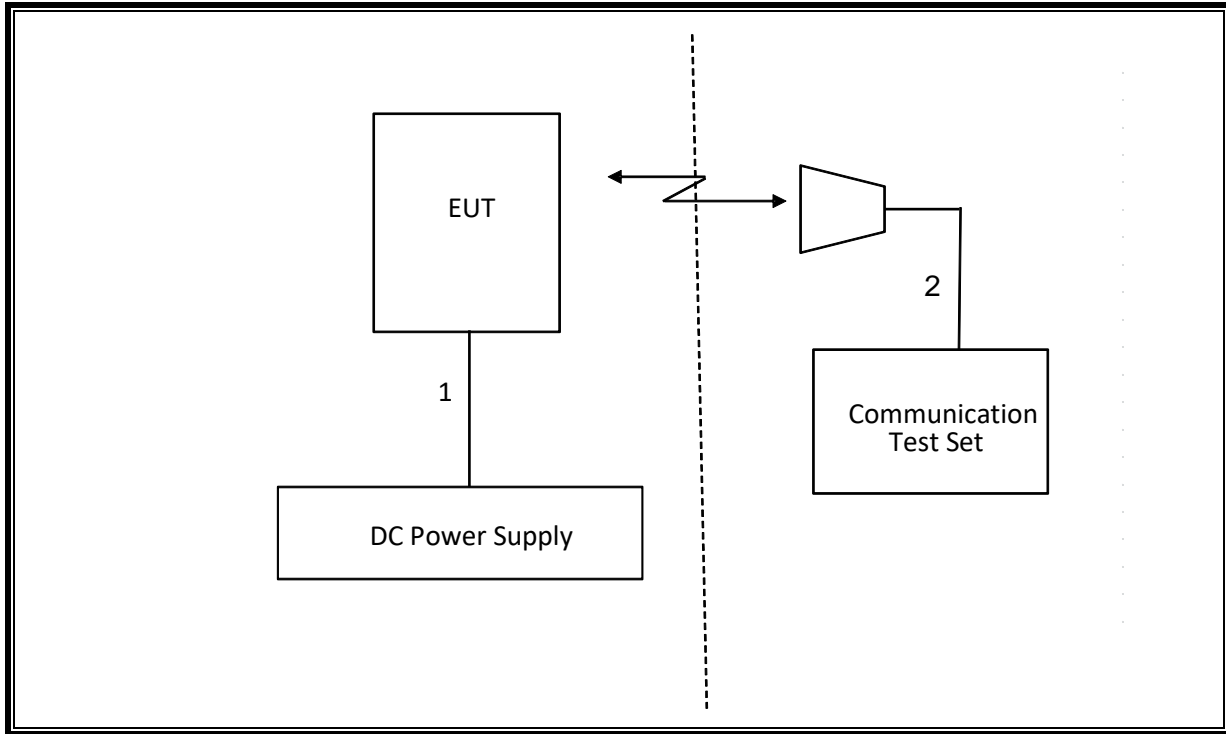
#### TEST SETUP

The EUT is continuously communicated to the call box during the tests.

All test item has been tested with DC 12V, 24V to determine the worst-case condition. The test results in condition of DC 24 V (Worst-case) is only described in this report.



**SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)**



## 6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Test Equipment List				
Description	Manufacturer	Model	S/N	Cal Due
Antenna, Tuned Dipole 400~1000 MHz	ETS	3121D DB4	00164753	06-30-19
Antenna, Horn, 40 GHz	ETS	3116C	00166155	12-04-19
Antenna, Horn, 40 GHz	ETS	3116C-PA	00168841	11-13-19
Antenna, Bilog, 30MHz-1GHz	SCHWARZBECK	VULB9163	749	04-14-19
Antenna, Horn, 18 GHz	ETS	3115	00167211	10-14-18
Antenna, Horn, 18 GHz	ETS	3115	00161451	03-10-19
Antenna, Horn, 18 GHz	ETS	3117	00168724	05-31-19
Antenna, Horn, 18 GHz	ETS	3117	00168717	05-31-19
Combiner	WEINSCHTEL	1575	2152	08-08-18
Communications Test Set	R&S	CMW500	150312	08-07-18
Communications Test Set	R&S	CMW500	115331	08-07-18
DC Power Supply	Agilent / HP	E3640A	MY54226395	08-07-18
Preamplifier, 1000 MHz	Sonoma	310N	341282	08-09-18
Preamplifier, 1000 MHz	Sonoma	310N	351741	08-07-18
Preamplifier	ETS	3115-PA	00167475	08-09-18
Preamplifier, 18 GHz	Miteq	AFS42-00101800-25-S-42	1896138	08-08-18
Spectrum Analyzer, 44 GHz	Agilent / HP	N9030A	MY54490312	08-08-18
EMI Test Receive, 40 GHz	R&S	ESU40	100439	08-08-18
EMI Test Receive, 40 GHz	R&S	ESU40	100457	08-08-18
High Pass Filter 1.2GHz	Micro-Tronics	HPM50108-02	G005	08-09-18
High Pass Filter 1.2GHz	Micro-Tronics	HPM50108-02	G006	08-08-18
High Pass Filter 2.8GHz	Micro-Tronics	HPM50111-02	010	08-09-18
High Pass Filter 2.8GHz	Micro-Tronics	HPM50111-02	011	08-08-18
High Pass Filter 4GHz	Micro-Tronics	HPM50118-02	G001	08-09-18
High Pass Filter 4GHz	Micro-Tronics	HPM50118-02	G002	08-08-18
Attenuator	PASTERNAK	PE7087-10	A009	08-08-18
Temperature Chamber	ESPEC	SH-642	93001109	08-08-18
UL Software				
Description	Manufacturer	Model	Version	
Antenna port test software	UL	CLT	Ver 2.2	

## 7. Summary Table

FCC Part Section	Test Description	Test Limit	Test Condition	Test Result	Note
2.1049	Occupied Band width (99%)	N/A	Conducted	N/A*	Refer to module test reports
22.917(a) 24.238(a)	Band Edge / Conducted Spurious Emission	-13dBm		N/A*	Refer to module test reports
2.1046	Conducted output power	N/A		N/A*	Refer to module test reports
22.355 24.235	Frequency Stability	2.5PPM		N/A*	Refer to module test reports
22.913(a)(2)	Effective Radiated Power	38.5 dBm	Radiated	Pass	30.70 dBm
24.232(c)	Equivalent Isotropic Radiated Power	33dBm		Pass	32.04 dBm
22.917(a) 24.238(a)	Radiated Spurious Emission	-13dBm		Pass	-38.6 dBm

\* All conducted test didn't performed because conducted output power of this device is in the module's conducted power tolerance range(+/- 1 dB). Also module was installed on this device as same condition with original approval condition.

Please refer to the module's the original approval FCC Part 22/24 test report .  
 (FCC ID: XPYLISAU200, Report No. 6-0082-11-1-2a (GSM) / 6-0082-11-1-2b (WCDMA) )

FCC Rule Part	Frequency Range [MHz]	Output Power [W]	Frequency Tolerance	Emission Designator	Emission Bandwidth [MHz]	Communication Type
GSM						
22H	824.2 - 848.8	1.175	2.5 ppm	247KGXW		GSM850
24E	1850.2 - 1909.8	1.600	2.5 ppm	247KG7W		GSM1900
WCDMA						
22H	826.4 - 846.6	0.140	2.5 ppm	4M15F9D		WCDMA B5
24E	1852.4 - 1907.6	0.753	2.5 ppm	4M15F9D		WCDMA B2

## 8. RADIATED TEST RESULTS

### 8.1. RADIATED POWER (ERP & EIRP)

#### RULE PART(S)

FCC: §2.1046, §22.913 and §24.232

#### LIMITS

22.913(a) - The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

24.232(c) - Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13dB.

#### TEST PROCEDURE

ANSI / TIA / EIA 603E Clause 2.2.17; ESU40 setting reference to 971168 D01 v03

For peak power measurement with a ESU40:

a) Set the RBW  $\geq$  OBW; b) Set VBW  $\geq 3 \times$  RBW; c) Set span  $\geq 2 \times$  RBW; d) Sweep time = auto couple; e) Detector = peak; f) Ensure that the number of measurement points  $\geq$  span/RBW; g) Trace mode = max hold;

For average power measurement with a ESU40:

a) Set span to at least 1.5 times the OBW; b) Set RBW = 1-5% of the OBW, not to exceed 1 MHz; c) Set VBW  $\geq 3 \times$  RBW; d) Set number of points in sweep  $\geq 2 \times$  span / RBW; e) Sweep time = auto-couple; f) Detector = RMS (power averaging); g) Use free run trigger If burst duty cycle  $\geq 98$ ; h) Use trigger to capture bursts If burst duty cycle  $< 98$ ; i) Trace average at least 100 traces in power averaging (*i.e.*, RMS) mode. j) Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function. (RBW/VBW are automatically set for LTE B41)

#### TEST RESULTS

**8.1.1. ERP/EIRP Results**

**GSM**

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
GSM850	GPRS	512	824.2	30.70	1174.9
		661	836.6	30.17	1039.9
		810	848.8	28.51	709.6
GSM1900	GPRS	512	1850.2	31.91	1552.4
		661	1880.0	30.92	1235.9
		810	1909.8	32.04	1599.6

**WCDMA**

Band	Mode	Channel	f [MHz]	ERP / EIRP	
				[dBm]	[mW]
Band 5	REL99	4132	826.4	21.47	140.3
		4183	836.6	19.99	99.8
		4233	846.6	17.50	56.2
Band 2	REL99	9262	1852.4	28.77	753.4
		9400	1880.0	27.49	561.0
		9538	1907.6	27.99	629.5

### 8.1.2. ERP/EIRP DATA

#### GSM 850

		High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2								
GSM GSM850 GPRS	Company:	KYUNGWOO SYSTECH INC.								
	Project #:	4788243069								
	Date:	2017.12.20								
	Test Engineer:	Robby, Lee								
	Configuration:	EUT ONLY, Z Position								
	Mode:	GPRS 850 MHz								
	<u>Test Equipment:</u>									
	Receiving:		VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT)							
	Substitution:		Dipole S/N: 00164753, 3m SMA Cable Warehouse.							
			f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	ERP	Limit	Margin
		MHz	(dBm)	(H/V)	(dB)	(dBd)	(dBm)	(dBm)	(dB)	
Low Ch										
824.20		25.37	V	1.1	-1.6	22.74	38.5	-15.7		
824.20		33.33	H	1.1	-1.6	30.70	38.5	-7.8		
Mid Ch										
836.60		25.74	V	1.1	-1.4	23.24	38.5	-15.2		
836.60		32.67	H	1.1	-1.4	30.17	38.5	-8.3		
High Ch										
848.80		26.48	V	1.1	-1.3	24.12	38.5	-14.3		
848.80		30.87	H	1.1	-1.3	28.51	38.5	-9.9		
Rev. 3.17.11		Note: For Band 13/17 ERP limit is 34.77dBm; For Band 26 limit is 50dBm								

#### GSM 1900

		High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2								
GSM GSM1900 GPRS	Company:	KYUNGWOO SYSTECH INC.								
	Project #:	4788243069								
	Date:	2017.12.20								
	Test Engineer:	Robby, Lee								
	Configuration:	EUT ONLY, Z Position								
	Mode:	GPRS 1900 MHz								
	<u>Test Equipment:</u>									
	Receiving:		3117[00168724] and Chamber 1 SMA Cables							
	Substitution:		3115[00161451] Substitution, 3m SMA Cable Warehouse							
			f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Delta
		GHz	(dBm)	(H/V)	(dB)	(dBi)	(dBm)	(dBm)	(dB)	
Low Ch										
1850.20		18.0	V	1.60	8.80	25.18	33.0	-7.8		
1850.20		24.7	H	1.60	8.80	31.91	33.0	-1.1		
Mid Ch										
1880.00		19.3	V	1.62	8.62	26.28	33.0	-6.7		
1880.00		23.9	H	1.62	8.62	30.92	33.0	-2.1		
High Ch										
1909.80		20.4	V	1.63	8.44	27.17	33.0	-5.8		
1909.80		25.2	H	1.63	8.44	32.04	33.0	-1.0		
Rev. 3.17.11										

**WCDMA Band 5**

		High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2							
		Company: KYUNGWOO SYSTECH INC. Project #: 4788243069 Date: 2017.12.21 Test Engineer: Robby, Lee Configuration: EUT ONLY, Z Position Mode: WCDMA_850 MHz  <b>Test Equipment:</b> Receiving: VULB9163-749, and 3m Chamber N-type Cable (Setup this one for testing EUT) Substitution: Dipole S/N: 00164753, 3m SMA Cable Warehouse.							
f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	ERP	Limit	Margin	Notes	
MHz	(dBm)	(H/V)	(dB)	(dBd)	(dBm)	(dBm)	(dB)		
Low Ch									
826.40	18.68	V	1.1	-1.5	16.06	38.5	-22.4		
826.40	24.09	H	1.1	-1.5	21.47	38.5	-17.0		
Mid Ch									
837.00	17.12	V	1.1	-1.4	14.62	38.5	-23.8		
837.00	22.49	H	1.1	-1.4	19.99	38.5	-18.5		
High Ch									
846.60	15.88	V	1.1	-1.3	13.49	38.5	-25.0		
846.60	19.89	H	1.1	-1.3	17.50	38.5	-21.0		
Rev. 3.17.11									

**WCDMA Band 2**

		High Frequency Substitution Measurement UL Korea, Ltd. Suwon Laboratory Chamber 2							
		Company: KYUNGWOO SYSTECH INC. Project #: 4788243069 Date: 2017.12.21 Test Engineer: Robby, Lee Configuration: EUT ONLY, X Position Mode: WCDMA_1900 MHz  <b>Test Equipment:</b> Receiving: 3117[00168724] and Chamber 1 SMA Cables Substitution: 3115[00161451] Substitution, 3m SMA Cable Warehouse							
f	SG reading	Ant. Pol.	Cable Loss	Antenna Gain	EIRP	Limit	Margin	Notes	
MHz	(dBm)	(H/V)	(dB)	(dBi)	(dBm)	(dBm)	(dB)		
Low Ch									
1852.40	14.58	V	1.60	8.79	21.77	33.0	-11.2		
1852.40	21.58	H	1.60	8.79	28.77	33.0	-4.2		
Mid Ch									
1880.00	10.92	V	1.62	8.62	17.92	33.0	-15.1		
1880.00	20.49	H	1.62	8.62	27.49	33.0	-5.5		
High Ch									
1907.60	8.79	V	1.63	8.45	15.61	33.0	-17.4		
1907.60	21.17	H	1.63	8.45	27.99	33.0	-5.0		
Rev. 3.17.11									
Note: For Band 4 EIRP limit is 30dBm									



## 8.2. FIELD STRENGTH OF SPURIOUS RADIATION

### RULE PART(S)

FCC: §2.1053, §22.917 and §24.238

### LIMIT

Part 22.917(a) & Part 24.238(a) & Part 27.53(g) The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log (P)$  dB.

### TEST PROCEDURE

ANSI / TIA / EIA 603E Clause 2.2.12; ESU40 setting reference to 971168 D01 v03

For peak power measurement with a ESU40:

- a) Set the RBW = 100 KHz for emission below 1GHz and 1MHz for emissions above 1GHz
- b) Set VBW  $\geq 3 \times$  RBW;
- c) Set span  $\geq 1.5$  times the OBW;
- d) Sweep time = auto couple;
- e) Detector = peak;
- f) Ensure that the number of measurement points  $\geq$  span/RBW;
- g) Trace mode = max hold;

### RESULTS

### 8.2.1. SPURIOUS RADIATION PLOTS

#### GSM 850

UL Korea, Ltd Suwon Laboratory Above 1GHz High Frequency Substitution Measurement									
Company:		KYUNGWOO SYSTECH INC.							
Project #:		4788243069							
Date:		2017.12.20							
Test Engineer:		Robby, Lee							
Configuration:		EUT ONLY, Z Position							
Mode:		GPRS 850 MHz							
Chamber		Pre-amplifier		Filter		Limit			
Chamber 2		AFS42		Filter 1		Part 22			
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 824.2MHz									
1.6484	-0.2	V	3.0	38.2	1.0	-37.5	-13.0	-24.5	
2.4726	0.0	V	3.0	38.8	1.0	-37.8	-13.0	-24.8	
3.2968	-9.6	V	3.0	39.4	1.0	-48.0	-13.0	-35.0	
1.6484	2.7	H	3.0	38.2	1.0	-34.6	-13.0	-21.6	
2.4726	0.2	H	3.0	38.8	1.0	-37.6	-13.0	-24.6	
3.2968	-10.4	H	3.0	39.4	1.0	-48.9	-13.0	-35.9	
Mid Ch, 836.6MHz									
1.6730	-0.3	V	3.0	38.2	1.0	-37.5	-13.0	-24.5	
2.5098	-1.5	V	3.0	38.8	1.0	-39.4	-13.0	-26.4	
3.3464	-8.4	V	3.0	39.5	1.0	-46.8	-13.0	-33.8	
1.6730	4.7	H	3.0	38.2	1.0	-32.5	-13.0	-19.5	
2.5098	-0.7	H	3.0	38.8	1.0	-38.5	-13.0	-25.5	
3.3464	-7.1	H	3.0	39.5	1.0	-45.5	-13.0	-32.5	
High Ch, 848.8MHz									
1.6976	0.4	V	3.0	38.2	1.0	-36.9	-13.0	-23.9	
2.5466	1.0	V	3.0	38.9	1.0	-36.9	-13.0	-23.9	
3.3952	-5.0	V	3.0	39.5	1.0	-43.5	-13.0	-30.5	
1.6976	6.3	H	3.0	38.2	1.0	-30.9	-13.0	-17.9	
2.5466	2.9	H	3.0	38.9	1.0	-35.0	-13.0	-22.0	
3.3952	-5.5	H	3.0	39.5	1.0	-44.0	-13.0	-31.0	
Rev. 03.03.09									
Note: No other emissions were detected above the system noise floor.									

GSM  
GSM850

**GSM 1900**

UL Korea, Ltd Suwon Laboratory Above 1GHz High Frequency Substitution Measurement									
Company: KYUNGWOO SYSTECH INC. Project #: 4788243069 Date: 2017.12.20 Test Engineer: Robby, Lee Configuration: EUT ONLY, Z Position Mode: GPRS 1900 MHz									
		Chamber	Pre-amplifier		Filter		Limit		
		Chamber 2	AFS42		Filter 1		Part 24		
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
<b>Low Ch, 1850.2MHz</b>									
3.7004	-7.8	V	3.0	39.7	1.0	-46.5	-13.0	-33.5	
5.5506	-7.9	V	3.0	39.9	1.0	-46.8	-13.0	-33.8	
7.4008	-2.2	V	3.0	39.4	1.0	-40.7	-13.0	-27.7	
3.7000	-4.9	H	3.0	39.7	1.0	-43.5	-13.0	-30.5	
5.5500	-8.2	H	3.0	39.9	1.0	-47.2	-13.0	-34.2	
7.4000	-2.5	H	3.0	39.4	1.0	-41.0	-13.0	-28.0	
<b>Mid Ch, 1880.0MHz</b>									
3.7600	-4.8	V	3.0	39.7	1.0	-43.5	-13.0	-30.5	
5.6400	-6.0	V	3.0	40.0	1.0	-45.0	-13.0	-32.0	
7.5200	-3.4	V	3.0	39.4	1.0	-41.8	-13.0	-28.8	
3.7600	-2.5	H	3.0	39.7	1.0	-41.2	-13.0	-28.2	
5.6400	-5.6	H	3.0	40.0	1.0	-44.5	-13.0	-31.5	
7.5200	-2.8	H	3.0	39.4	1.0	-41.2	-13.0	-28.2	
<b>High Ch, 1909.8 MHz</b>									
3.8196	-0.6	V	3.0	39.7	1.0	-39.3	-13.0	-26.3	
5.7284	-0.9	V	3.0	40.0	1.0	-39.9	-13.0	-26.9	
7.6392	-2.7	V	3.0	39.3	1.0	-41.0	-13.0	-28.0	
3.8196	1.4	H	3.0	39.7	1.0	-37.3	-13.0	-24.3	
5.7284	1.1	H	3.0	40.0	1.0	-37.9	-13.0	-24.9	
7.6392	-2.6	H	3.0	39.3	1.0	-40.9	-13.0	-27.9	
Rev. 03.03.09 Note: No other emissions were detected above the system noise floor.									

GSM  
 GSM1900  
 GPRS

**WCDMA Band 5**

UL Korea, Ltd Suwon Laboratory Above 1GHz High Frequency Substitution Measurement										
Company:		KYUNGWOO SYSTECH INC.								
Project #:		4788243069								
Date:		2017.12.21								
Test Engineer:		Robby, Lee								
Configuration:		EUT ONLY, X Position								
Mode:		WCDMA_850 MHz								
Chamber		Pre-amplifier			Filter		Limit			
Chamber 2		AF S42			Filter 1		Part 22			
f	SG reading	Ant. Pol.	Distance	Preamp	Filter	EIRP	Limit	Delta	Notes	
GHz	(dBm)	(H/V)	(m)	(dB)	(dB)	(dBm)	(dBm)	(dB)		
Low Ch, 826.40MHz										
1.6520	-14.0	V	3.0	38.2	1.0	-51.2	-13.0	-38.2		
2.4790	-12.3	V	3.0	38.8	1.0	-50.1	-13.0	-37.1		
3.3056	-10.8	V	3.0	39.4	1.0	-49.2	-13.0	-36.2		
1.6520	-9.6	H	3.0	38.2	1.0	-46.9	-13.0	-33.9		
2.4790	-11.9	H	3.0	38.8	1.0	-49.7	-13.0	-36.7		
3.3056	-10.4	H	3.0	39.4	1.0	-48.9	-13.0	-35.9		
Mid Ch, 836.6MHz										
1.6732	-17.3	V	3.0	38.2	1.0	-54.6	-13.0	-41.6		
2.5098	-11.7	V	3.0	38.8	1.0	-49.5	-13.0	-36.5		
3.3464	-10.9	V	3.0	39.5	1.0	-49.3	-13.0	-36.3		
1.6732	-12.9	H	3.0	38.2	1.0	-50.1	-13.0	-37.1		
2.5098	-11.4	H	3.0	38.8	1.0	-49.2	-13.0	-36.2		
3.3464	-9.8	H	3.0	39.5	1.0	-48.2	-13.0	-35.2		
High Ch, 846.6MHz										
1.6932	-14.4	V	3.0	38.2	1.0	-51.6	-13.0	-38.6		
2.5390	-10.7	V	3.0	38.9	1.0	-48.6	-13.0	-35.6		
3.3860	-11.0	V	3.0	39.5	1.0	-49.5	-13.0	-36.5		
1.6932	-8.3	H	3.0	38.2	1.0	-45.6	-13.0	-32.6		
2.5390	-10.6	H	3.0	38.9	1.0	-48.5	-13.0	-35.5		
3.3860	-10.5	H	3.0	39.5	1.0	-49.0	-13.0	-36.0		
Rev. 03.03.09										
Note: No other emissions were detected above the system noise floor.										

WCDMA  
 Band 5  
 REL99

**WCDMA Band 2**

UL Korea, Ltd Suwon Laboratory Above 1GHz High Frequency Substitution Measurement									
Company:		KYUNGWOO SYSTECH INC.							
Project #:		4788243069							
Date:		2017.12.21							
Test Engineer:		Robby, Lee							
Configuration:		EUT ONLY, X Position							
Mode:		WCDMA, 1900MHz							
Chamber		Pre-amplifier		Filter		Limit			
Chamber 2		AFS42		Filter 1		Part 24			
f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
<b>Low Ch, 1852.4MHz</b>									
3.7048	-6.6	V	3.0	39.7	1.0	-45.3	-13.0	-32.3	
5.5572	-8.0	V	3.0	39.9	1.0	-46.9	-13.0	-33.9	
7.4096	-2.5	V	3.0	39.4	1.0	-41.0	-13.0	-28.0	
3.7048	-6.9	H	3.0	39.7	1.0	-45.6	-13.0	-32.6	
5.5572	-8.4	H	3.0	39.9	1.0	-47.3	-13.0	-34.3	
7.4096	-2.1	H	3.0	39.4	1.0	-40.5	-13.0	-27.5	
<b>Mid Ch, 1880MHz</b>									
3.7600	-10.4	V	3.0	39.7	1.0	-49.1	-13.0	-36.1	
5.6400	-8.6	V	3.0	40.0	1.0	-47.6	-13.0	-34.6	
7.5200	-3.2	V	3.0	39.4	1.0	-41.6	-13.0	-28.6	
3.7600	-6.7	H	3.0	39.7	1.0	-45.4	-13.0	-32.4	
5.6400	-8.8	H	3.0	40.0	1.0	-47.8	-13.0	-34.8	
7.5200	-3.3	H	3.0	39.4	1.0	-41.7	-13.0	-28.7	
<b>High Ch, 1907.6MHz</b>									
3.8152	-7.7	V	3.0	39.7	1.0	-46.4	-13.0	-33.4	
5.7228	-7.9	V	3.0	40.0	1.0	-46.8	-13.0	-33.8	
7.6304	-3.0	V	3.0	39.3	1.0	-41.4	-13.0	-28.4	
3.8152	-6.0	H	3.0	39.7	1.0	-44.7	-13.0	-31.7	
5.7228	-7.7	H	3.0	40.0	1.0	-46.7	-13.0	-33.7	
7.6304	-2.4	H	3.0	39.3	1.0	-40.8	-13.0	-27.8	
Rev. 03.03.09									
Note: No other emissions were detected above the system noise floor.									

WCDMA  
 Band 2  
 REL99

**END OF REPORT**