

FCC 47 CFR PART 27**Test Report**

Product Type : Wireless module

Applicant : Telit Communications S.p.A.

Address : Viale Stazione di Prosecco 5/b, Trieste, 34010, Italy

Trade Name : Telit

Model Number : HE920-NA

Test Specification : FCC 47 CFR PART 27 SUBPART L: Oct. 2012
RSS-139 Issue 2, February 2009
RSS-Gen Issue 3, December 2010
ANSI/TIA-603-C-2004

Application Purpose : Original

Receive Date : Nov. 12, 2012

Test Period : Nov. 20, 2012 ~ Feb. 07, 2013

Issue Date : Apr. 09, 2013

Issue by

A Test Lab Techno Corp.
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Taiwan Accreditation Foundation accreditation number: 1330

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Revision History

Rev.	Issue Date	Revisions	Revised By
00	Mar. 18, 2013	Initial Issue	
01	Apr. 09, 2013	Revised IC number.	Joyce Liao

Verification of Compliance

Issued Date: 04/09/2013

Product Type : Wireless module

Applicant : Telit Communications S.p.A.

Address : Viale Stazione di Prosecco 5/b, Trieste, 34010, Italy

Trade Name : Telit

Model Number : HE920-NA

FCC ID : RI7HE920NA

IC : 5131A-HE920NA

EUT Rated Voltage : DC 3.8V

Test Voltage : DC 3.8V

Applicable Standard : FCC 47 CFR PART 27 SUBPART L: Oct. 2012
CANADA RSS-139 Issue 2, February 2009
CANADA RSS-Gen Issue 3, December 2010
ANSI/TIA-603-C-2004

Application Purpose : Original

Test Result : Complied

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<http://www.atl-lab.com.tw/e-index.htm>

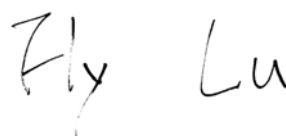


The above equipment was tested by A Test Lab Techno Corp. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4: 2009 and the energy emitted by the sample tested as described in this report is in compliance with the requirements of FCC Rules Part 22H, Part 24E.

The test results of this report relate only to the tested sample identified in this report.

Approved By : 

(Manager)

Reviewed By : 

(Testing Engineer)

(Fly Lu)

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1 General Information

1.1. EUT Description

Applicant		Telit Communications S.p.A.			
Applicant Address		Viale Stazione di Prosecco 5/b, Trieste, 34010, Italy			
Manufacturer		Telit Communications S.p.A.			
Manufacturer Address		Via Stazione di Prosecco, 5/B 34010 Sgonico Italy			
Product Type		Wireless module			
Trade Name		Telit			
Model Number		HE920-NA			
FCC ID		RI7HE920NA			
IC		5131A-HE920NA			
Mode	WCDMA	Band	UL Frequency (MHz)	DL Frequency (MHz)	Modulation
		IV	1712.4 ~ 1752.6	2112.4 ~ 2152.6	QPSK
Type of Antenna		Dipole Antenan			
Antenna Gain (dBi)		2.0	dBi		
Max. RF Output Power		27.08	dBm /	0.511	W
Max. EIRP		24.73	dBm /	0.297	W
Emission Designator		4M13F9W			

1.2. Mode of Operation

ATL has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Test Mode
Mode 1: WCDMA Band IV Link Mode
Mode 2: Receive Link Mode

Note: Regards to the frequency band operation: the lowest, middle and highest frequency of channel were selected to perform the test, then shown on this report.

Tested System Details

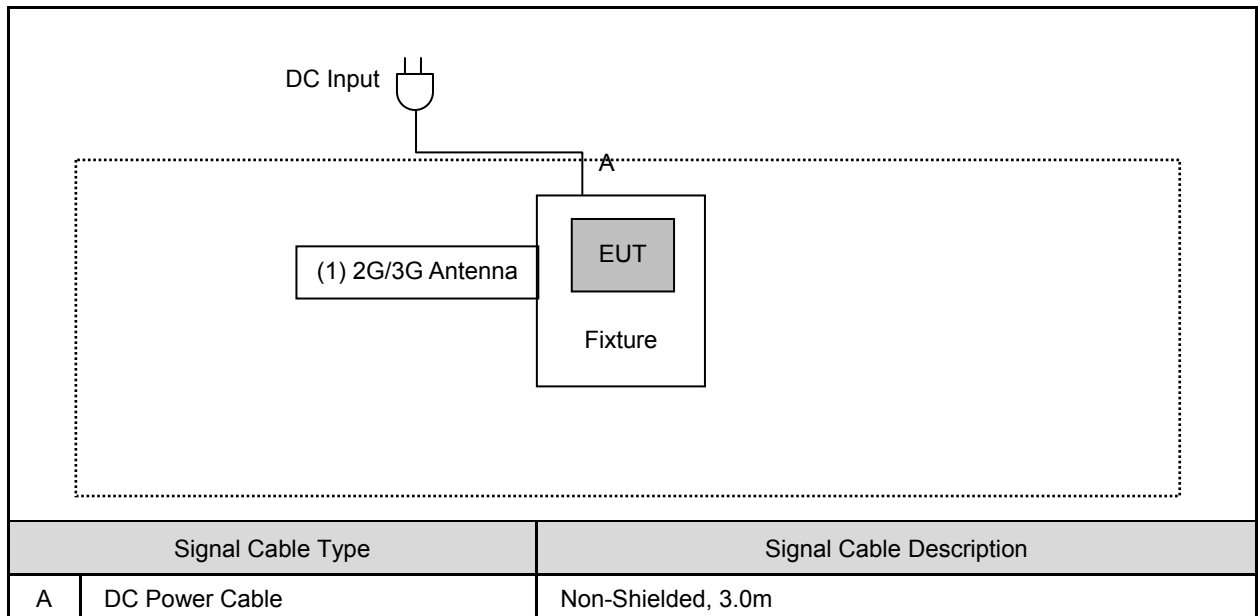
The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

	Product	Manufacturer	Model Number	Serial No.	Power Cord
1.	Universal Radio Communication Tester	R&S	CMU200	109369	N/A

1.3. EUT Exercise Software

1.	Setup the EUT and Base Station (CMU200) as shown on 1.4.
2.	Turn on the power of all equipment.

1.4. Configuration of Test System Details



Devices Description					
	Product	Manufacturer	Model Number	Serial Number	Power Cord
(1)	2G/3G Antenna (Max. Gain: 2.0dBi)	HANKOOK ANTENNA CO., LTD.	TB-800/1900-SMA	N/A	N/A

1.5. Test Site Environment

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	23.0
Humidity (%RH)	25-75	55.2
Barometric pressure (mbar)	860-1060	950

1.6. Summary of Test Result

Description	FCC Rule	IC Rule	Limit	Result
Conducted Output Power	§2.1046	N/A	N/A	Pass
Equivalent Isotropic Radiated Power	§27.50(d)(2)	RSS-139 (6.4) SRSP-513(5.1.2)	< 1 Watts	Pass
Occupied Bandwidth	§2.1049 §27.53(g)	N/A	N/A	Pass
Band Edge Measurement	§2.1051 §27.53(g)	RSS-139 (6.5)	$< 43 + 10\log_{10}(P[\text{Watts}])$	Pass
Conducted Emission	§2.1051 §27.53(g)	RSS-139 (6.5)	$< 43 + 10\log_{10}(P[\text{Watts}])$	Pass
Field Strength of Spurious Radiation	§2.1053 §27.53(g)	RSS-139 (6.5)	$< 43 + 10\log_{10}(P[\text{Watts}])$	Pass
Frequency Stability for Temperature & Voltage	§2.1055 §27.54	RSS-139(6.3)	< 2.5 ppm	Pass

2 RF Output Power Test

2.1. Limit

N/A

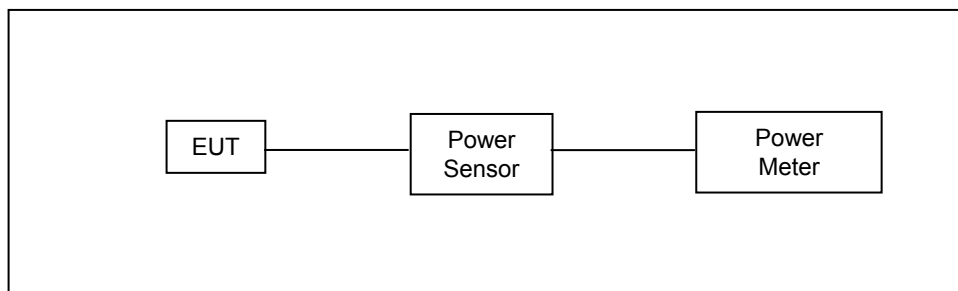
2.2. Test Instruments

Equipment	Manufacturer	Model Number	Serial No.	Cal. Date	Remark
Universal Radio Communication Tester	ROHDE & SCHWARZ	CMU200	109369	08/07/2012	(2)
Single Channel PK Power Sensor	Agilent	N1911A	MY45101619	12/15/2011	(1)
Wideband Power Meter	Agilent	N1921A	MY45241957	12/15/2011	(1)
Test Site	ATL	TE05	TE05	N.C.R.	-----

Remark: ⁽¹⁾ Calibration period 1 year. ⁽²⁾ Calibration period 2 years.

Note: N.C.R. = No Calibration Request.

2.3. Test Setup



2.4. Test Procedure

The measurement is made according to ANSI/TIA-603-C-2004 as follows:

1. The transmitter output was connected to power meter and base station through power divider.
2. Set base station for EUT at WCDMA Band IV, power level was set to maximum.
3. Select lowest, middle, and highest channels for each band.

HSDPA Data Devices setup

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	$\beta_{hs}^{(1,2)}$	CM (dB) ⁽³⁾	MRP (dB) ⁽³⁾
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 ⁽⁴⁾	15/15 ⁽⁴⁾	64	12/15 ⁽⁴⁾	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5
Note 1. Δ_{ACK}, Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$ 2. For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude(EVM) with HS-DPCCH test in clause 5.13.1A and HSDPA EVM with phase discontinuity in clause 5.13.1AA, Δ_{ACK} and $\Delta_{NACK} = 30/15$ with $\beta_{hs} = 30/15 * \beta_c$ and $\Delta_{CQI} = 24/15$ with $\beta_{hs} = 24/15 * \beta_c$ 3. CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases. 4. For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$.							

Table 1. Setup for Release 5 HSDPA

2.5. Uncertainty

The measurement uncertainty is defined as for RF output power measurement is 1.2 dB.

2.6. Test Result

Model Number	HE920-NA					
Test Item	RF Output Power					
Date of Test	11/20/2012				Test Site	TE05
Bands	Sub-Test	Frequency (MHz)	Average Power		Peak Power	
			(dBm)	(W)	(dBm)	(W)
WCDMA IV (RMC 12.2K)	-----	1712.4	23.73	0.236	26.85	0.484
		1740.0	23.54	0.226	26.77	0.475
		1752.6	23.85	0.243	27.08	0.511
HSDPA IV	1	1712.4	22.82	0.191	25.94	0.393
		1740.0	22.69	0.186	25.81	0.381
		1752.6	23.05	0.202	26.17	0.414
	2	1712.4	22.81	0.191	25.93	0.392
		1740.0	22.71	0.187	25.83	0.383
		1752.6	23.07	0.203	26.19	0.416
	3	1712.4	22.30	0.170	25.42	0.348
		1740.0	22.21	0.166	25.33	0.341
		1752.6	22.52	0.179	25.64	0.366
	4	1712.4	22.32	0.171	25.44	0.350
		1740.0	22.20	0.166	25.32	0.340
		1752.6	22.54	0.179	25.66	0.368
HSUPA IV	1	1712.4	22.37	0.173	25.50	0.355
		1740.0	22.32	0.171	25.45	0.351
		1752.6	22.78	0.190	25.91	0.390
	2	1712.4	20.35	0.108	23.48	0.223
		1740.0	20.30	0.107	23.43	0.220
		1752.6	20.76	0.119	23.89	0.245
	3	1712.4	21.36	0.137	24.49	0.281
		1740.0	21.30	0.135	24.43	0.277
		1752.6	21.75	0.150	24.88	0.308
	4	1712.4	20.36	0.109	23.49	0.223
		1740.0	20.30	0.107	23.43	0.220
		1752.6	20.77	0.119	23.90	0.245
	5	1712.4	22.36	0.172	25.49	0.354
		1740.0	22.27	0.169	25.40	0.347
		1752.6	22.74	0.188	25.87	0.386

Note: The testing result was used peak detector.

3 Effective Radiated Power / Equivalent Isotropic Radiated Power Test

3.1. Limit

For FCC Part 27.50(d)(2): The EIRP of mobile transmitters are limited to 1 watt for 1710~1755 MHz.

3.2. Test Instruments

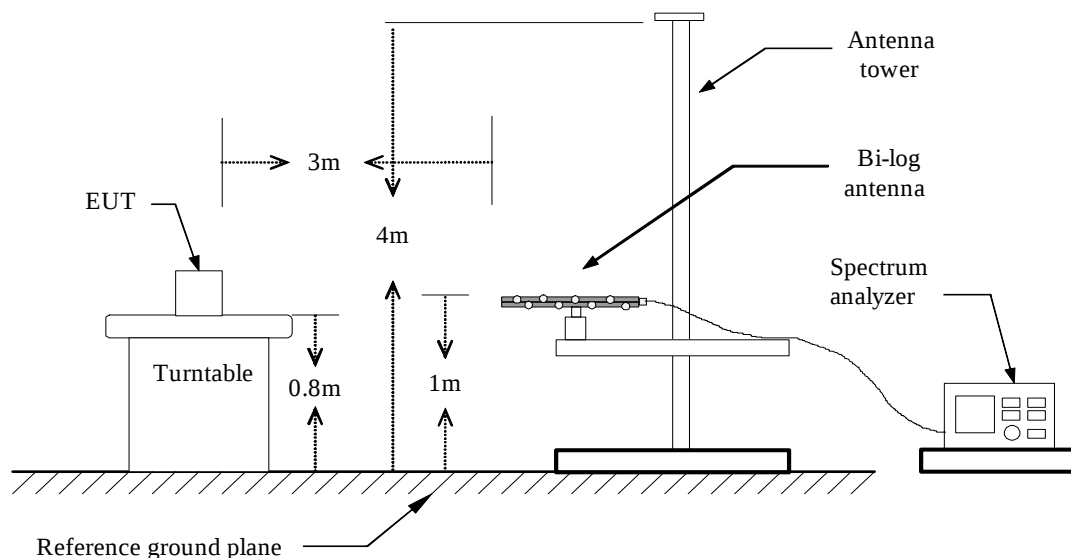
3 Meter Chamber					
Equipment	Manufacturer	Model Number	Serial No.	Cal. Date	Remark
RF Pre-selector	Agilent	N9039A	MY46520256	01/21/2013	(1)
Spectrum Analyzer	Agilent	E4446A	MY46180578	01/21/2013	(1)
Pre Amplifier	Agilent	8449B	3008A02237	02/22/2012	(1)
Pre Amplifier	Agilent	8447D	2944A10961	02/22/2012	(1)
Broadband Antenna (30MHz~1GHz)	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	9163-270	06/29/2012	(1)
Horn Antenna (1~18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	9120D-550	06/15/2012	(1)
Horn Antenna (18~40GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9170	9170-320	06/21/2012	(1)
Test Site	ATL	TE01	888001	12/20/2011	(1)

Remark: ⁽¹⁾ Calibration period 1 year. ⁽²⁾ Calibration period 2 years.

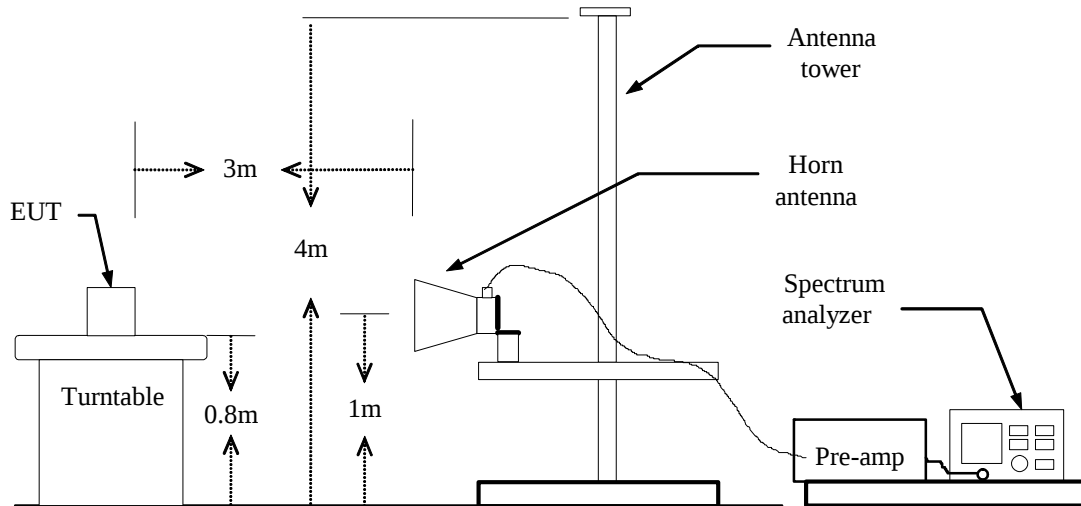
Note: N.C.R. = No Calibration Request.

3.3. Test Setup

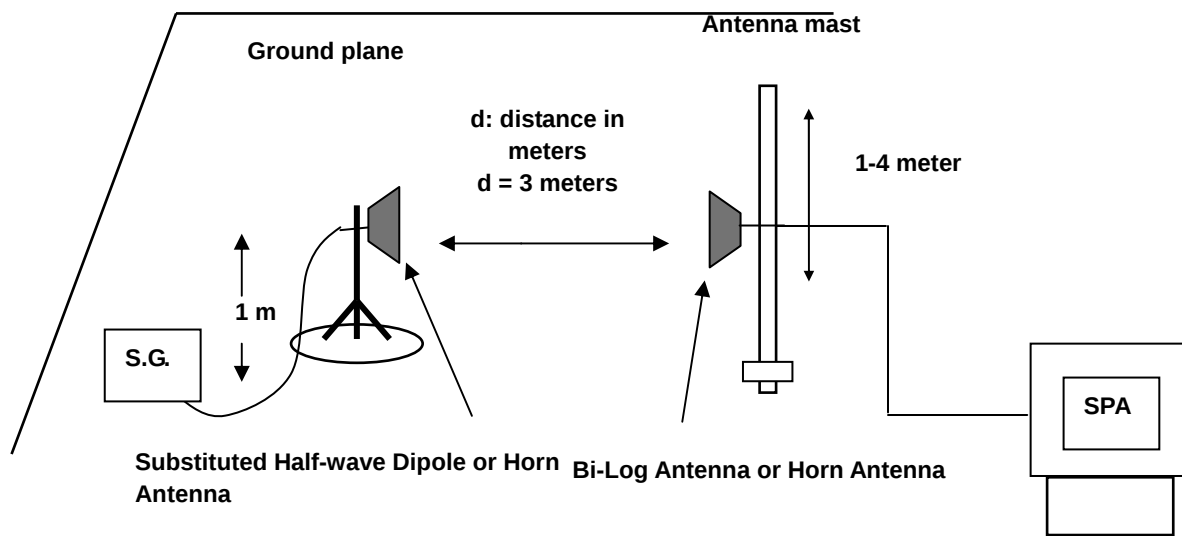
Below 1 GHz



Above 1 GHz



For Substituted Method Test Set-UP



3.4. Test Procedure

The measurement is made according to ANSI/TIA-603-C-2004 as follows:

The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.

During the measurement of the EUT, the resolution bandwidth was set to 3MHz and the average bandwidth was set to 3MHz. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna. The reading was recorded and the field strength (E in dBuV/m) was calculated.

EIRP in frequency band 1712.4 –1752.6 were measured using a substitution method. The EUT was replaced by horn antenna (1712.4 –1752.6) connected to a signal generator. The spectrum analyzer reading was recorded and ERP/EIRP was calculated as follows:

$$\text{ERP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBd)} - \text{Cable (dB)}$$

$$\text{EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable (dB)}$$

3.5. Uncertainty

The measurement uncertainty is defined as for Field Strength of Spurious Radiation measurement is ± 3.072 dB.

3.6. Test Result

Model Number	HE920-NA						
Test Item	E.IR.P.						
Test Mode	Mode 1						
Date of Test	02/07/2013				Test Site	TE01	
Bands	Frequency (MHz)	Ant. Polar.	Read Level (dBm)	Correction factor (dBm)	E.IR.P.		Limit (W)
					(dBm)	(W)	
WCDMA IV (RMC 12.2K)	1712.4	H	11.81	10.22	22.03	0.160	< 1
		V	12.76	10.21	22.97	0.198	< 1
	1740.0	H	13.51	10.38	23.89	0.245	< 1
		V	14.35	10.38	24.73	0.297	< 1
	1752.6	H	10.93	10.55	21.48	0.141	< 1
		V	12.05	10.55	22.60	0.182	< 1

Note: 1. ERP/EIRP = Read Level + Correction factor.

2. For WCDMA signals, a peak detector is used with RBW = VBW = 5MHz.

4 Occupied Bandwidth Test

4.1. Limit

The Occupied Bandwidth Limit:

N/A.

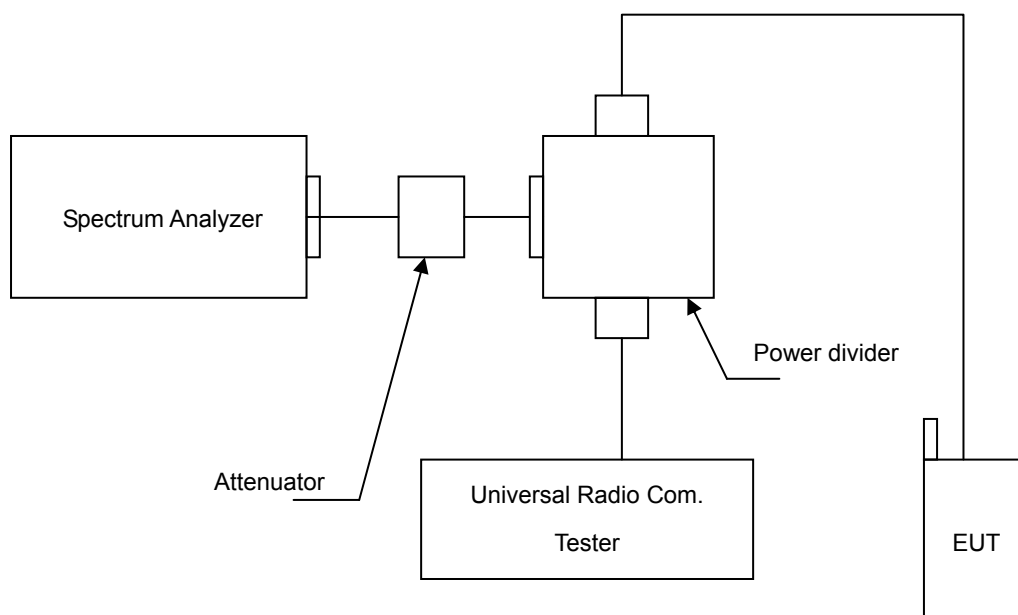
4.2. Test Instruments

Equipment	Manufacturer	Model Number	Serial No.	Cal. Date	Remark
Universal Radio Communication Tester	R & S	CMU200	109369	08/07/2012	(2)
Spectrum Analyzer	Agilent	E4445A	MY46181986	05/10/2012	(1)
Attenuator	RADIALL	R41572000	0603033073	N.C.R.	-----
Power Divider	Agilent	87302C	3239A00760	N.C.R.	-----
Test Site	ATL	TE05	TE05	N.C.R.	-----

Remark: ⁽¹⁾ Calibration period 1 year. ⁽²⁾ Calibration period 2 years.

Note: N.C.R. = No Calibration Request.

4.3. Setup



4.4. Test Procedure

The measurement is made according to FCC rules part 27:

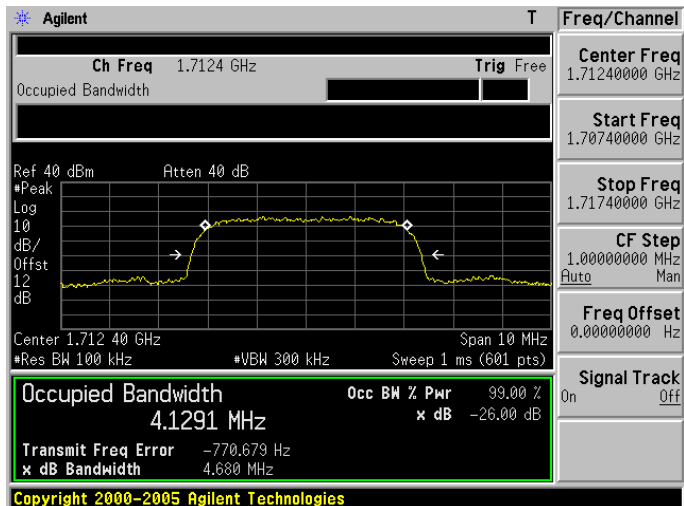
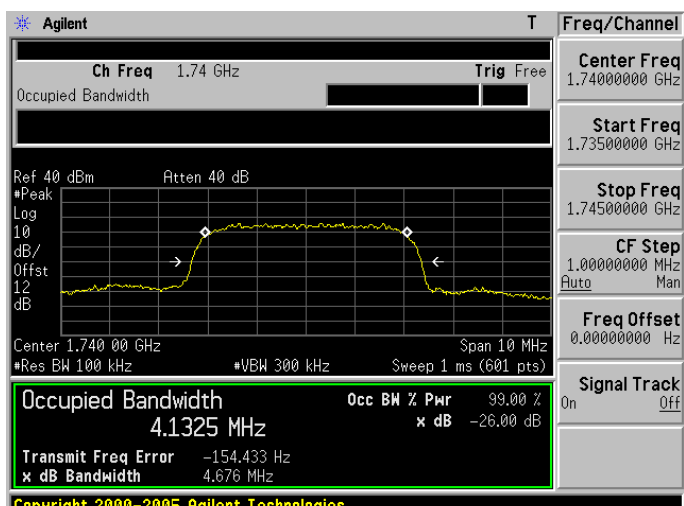
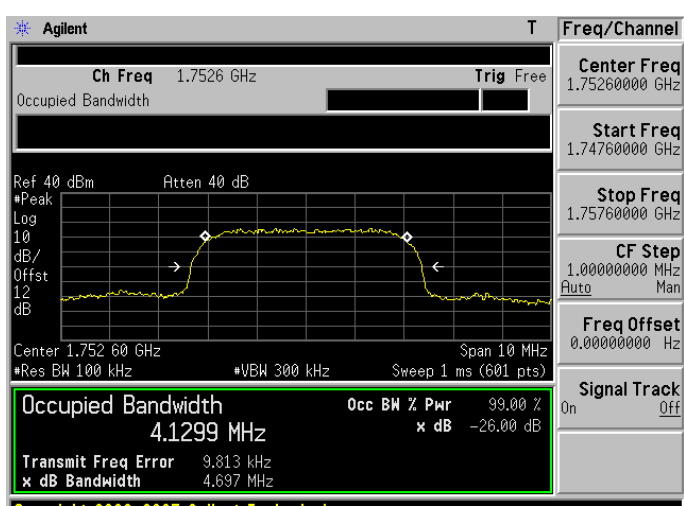
1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The occupied bandwidth of middle channel for the highest and lowest RF powers was measured.

4.5. Uncertainty

The measurement uncertainty is defined as $\pm 10\text{Hz}$

4.6. Test Result

Model Number	HE920-NA			
Test Item	Occupied Bandwidth			
Test Mode	Mode 1			
Date of Test	11/20/2012			Test Site TE05
Channel No.	Frequency (MHz)	99 % Bandwidth (MHz)	Limit	Note
1312	1712.4	4.1291	N/A	RBW: 100kHz , VBW: 300kHz
1450	1740.0	4.1325	N/A	RBW: 100kHz , VBW: 300kHz
1513	1752.6	4.1299	N/A	RBW: 100kHz , VBW: 300kHz

Mode 1	
CH 1312	 Agilent T Freq/Channel Ch Freq 1.7124 GHz Trig Free Center Freq 1.71240000 GHz Start Freq 1.70740000 GHz Stop Freq 1.71740000 GHz CF Step 1.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Ref 40 dBm Atten 40 dB Peak Log 10 dB/Offst 12 dB Center 1.712 40 GHz Span 10 MHz Res BW 100 kHz VBW 300 kHz Sweep 1 ms (601 pts) Occupied Bandwidth 4.1291 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -770.679 Hz x dB Bandwidth 4.680 MHz Copyright 2000-2005 Agilent Technologies
CH1450	 Agilent T Freq/Channel Ch Freq 1.74 GHz Trig Free Center Freq 1.74000000 GHz Start Freq 1.73500000 GHz Stop Freq 1.74500000 GHz CF Step 1.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Ref 40 dBm Atten 40 dB Peak Log 10 dB/Offst 12 dB Center 1.740 00 GHz Span 10 MHz Res BW 100 kHz VBW 300 kHz Sweep 1 ms (601 pts) Occupied Bandwidth 4.1325 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error -154.433 Hz x dB Bandwidth 4.676 MHz Copyright 2000-2005 Agilent Technologies
CH1513	 Agilent T Freq/Channel Ch Freq 1.7526 GHz Trig Free Center Freq 1.75260000 GHz Start Freq 1.74760000 GHz Stop Freq 1.75760000 GHz CF Step 1.00000000 MHz Auto Man Freq Offset 0.00000000 Hz Signal Track On Off Ref 40 dBm Atten 40 dB Peak Log 10 dB/Offst 12 dB Center 1.752 60 GHz Span 10 MHz Res BW 100 kHz VBW 300 kHz Sweep 1 ms (601 pts) Occupied Bandwidth 4.1299 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB Transmit Freq Error 9.813 kHz x dB Bandwidth 4.697 MHz Copyright 2000-2005 Agilent Technologies

5 Band Edge Test

5.1. Limit

The Band Edge Limit:

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.

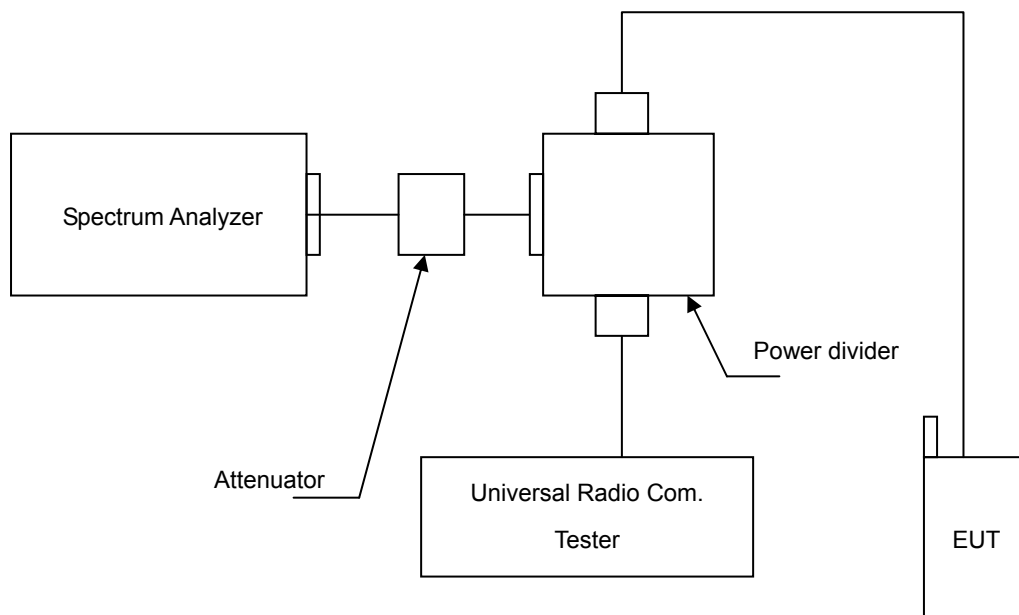
5.2. Test Instruments

Equipment	Manufacturer	Model Number	Serial No.	Cal. Date	Remark
Universal Radio Communication Tester	R & S	CMU200	109369	08/07/2012	(2)
Spectrum Analyzer	Agilent	E4445A	MY46181986	05/10/2012	(1)
Attenuator	RADIALL	R41572000	0603033073	N.C.R.	-----
Power Divider	Agilent	87302C	3239A00760	N.C.R.	-----
Test Site	ATL	TE05	TE05	N.C.R.	-----

Remark: ⁽¹⁾ Calibration period 1 year. ⁽²⁾ Calibration period 2 years.

Note: N.C.R. = No Calibration Request.

5.3. Setup



5.4. Test Procedure

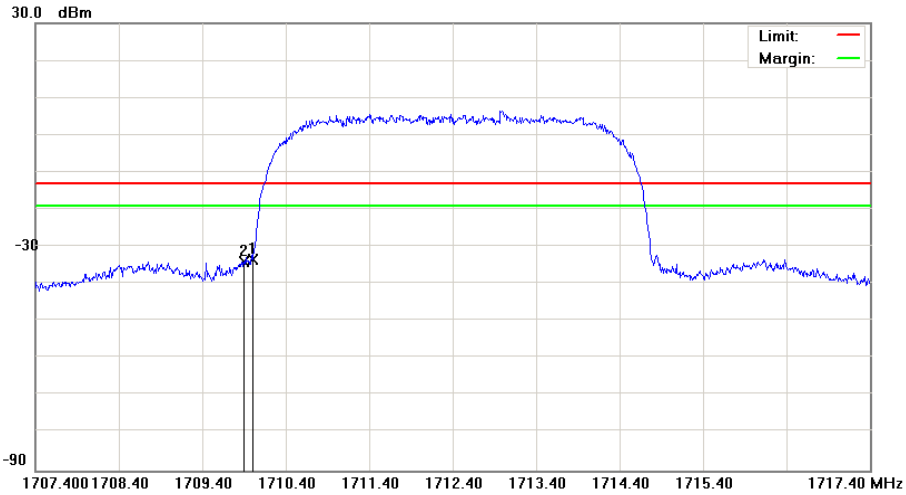
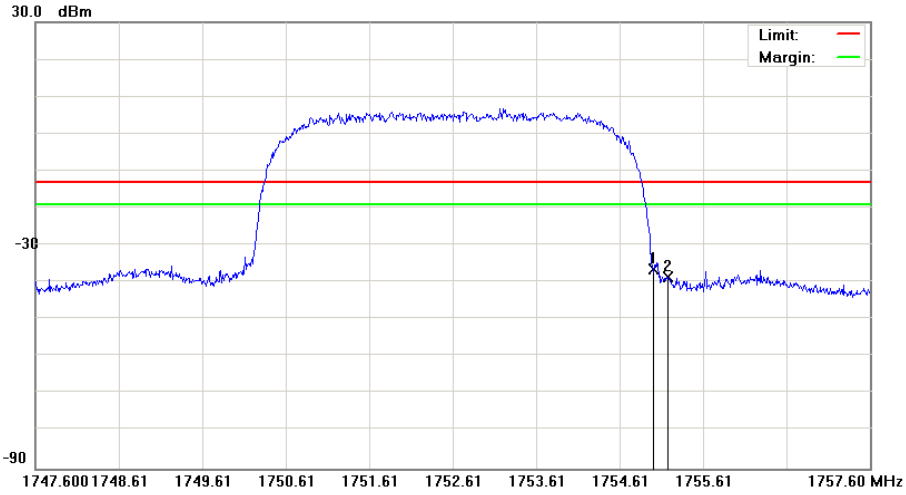
The measurement is made according to FCC rules part 27:

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The band edge of low and high channels for the highest RF powers within the transmitting frequency band were measured. Setting RBW as roughly BW/100.
3. The band edge setting:RB=47 kHz; VB=150 kHz for WCDMA Band IV.

5.5. Uncertainty

The measurement uncertainty is defined as $\pm 10\text{Hz}$

5.6. Test Result

Model Number	HE920-NA				
Test Item	Band Edge				
Test Mode	Mode 1				
Date of Test	11/20/2012		Test Site	TE05	
Band	Channel	Frequency (MHz)	Band Edge (dBm)	Limit (dBm)	Result
Lower	1312	1710.00	-33.53	-13	Pass
Higher	1513	1755.00	-36.37	-13	Pass
Lower Band					
					

6 Conducted Spurious Emission Test

6.1. Limit

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.

6.2. Test Instruments

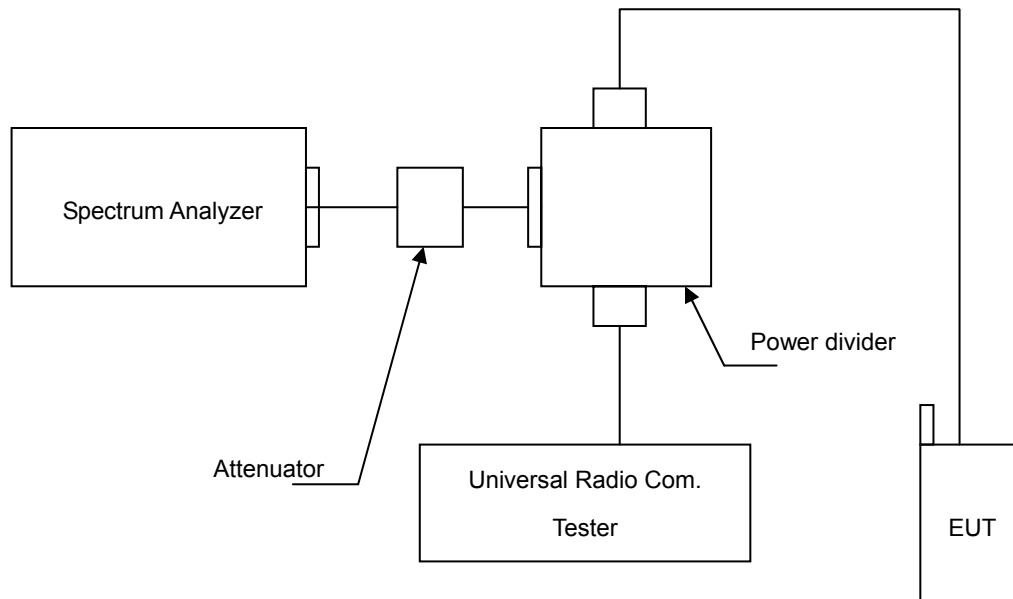
Equipment	Manufacturer	Model Number	Serial No.	Cal. Date	Remark
Universal Radio Communication Tester	R & S	CMU200	109369	08/07/2012	(2)
Spectrum Analyzer	Agilent	E4445A	MY46181986	05/10/2012	(1)
Attenuator	RADIALL	R41572000	0603033073	N.C.R.	----
Power Divider	Agilent	87302C	3239A00760	N.C.R.	----
Test Site	ATL	TE05	TE05	N.C.R.	----

Remark: ⁽¹⁾ Calibration period 1 year. ⁽²⁾ Calibration period 2 years.

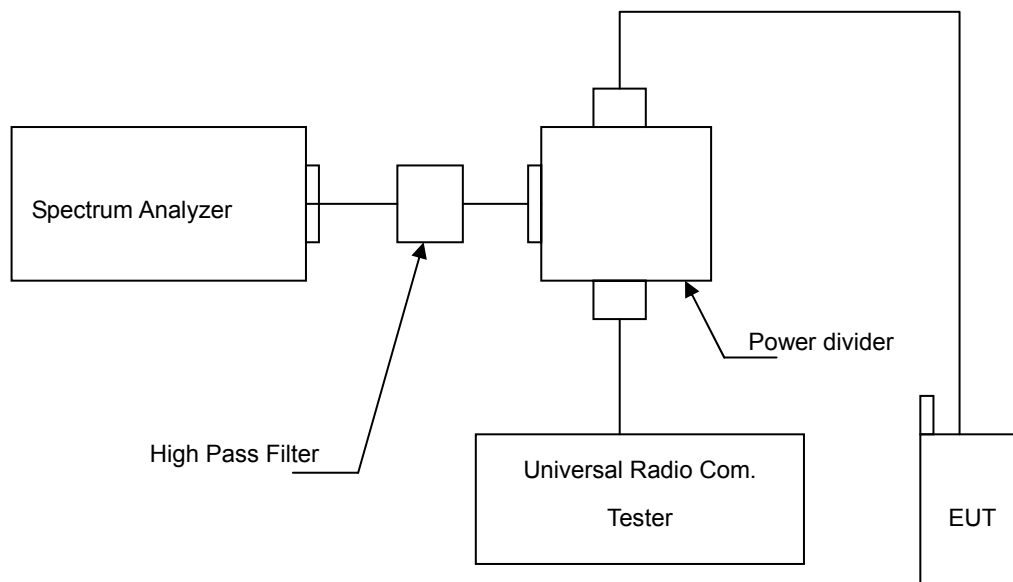
Note: N.C.R. = No Calibration Request.

6.3. Setup

Below 2.8GHz



Above 2.8GHz



6.4. Test Procedure

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The middle channel for the highest RF power within the transmitting frequency was measured.
3. The conducted spurious emission for the whole frequency range was taken.
4. Test setting at WCDMA Band IV RB=1MHz, VB=1MHz.

6.5. Uncertainty

The measurement uncertainty is evaluated as ± 2.24 dB.

6.6. Test Result

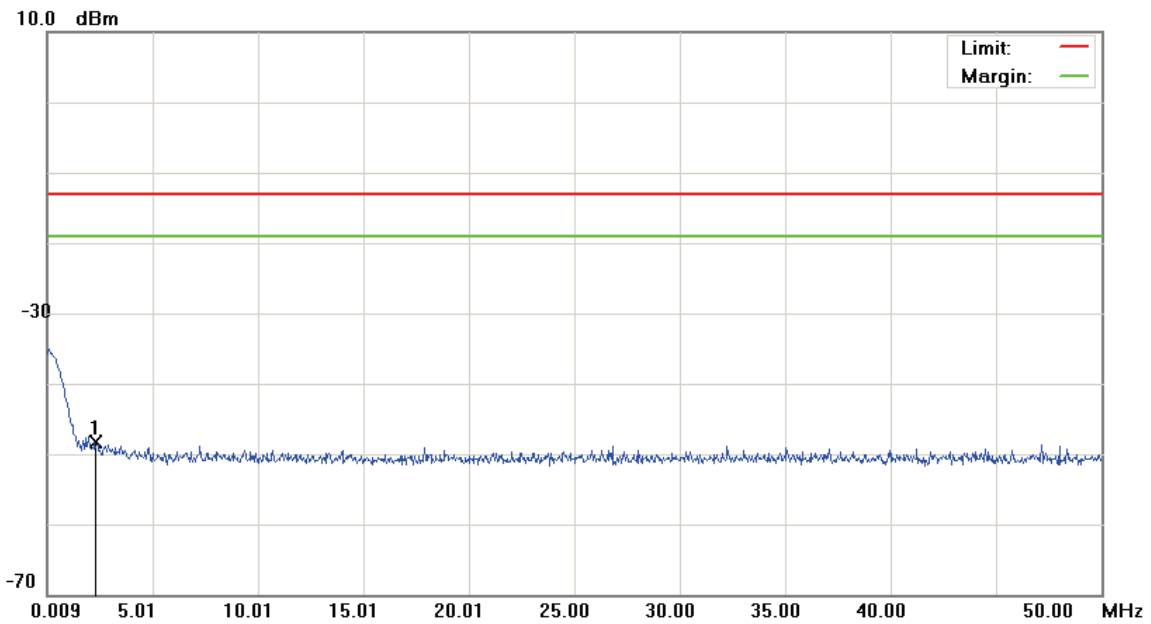
Model Number	HE920-NA		
Test Item	Conducted Spurious Emission		
Test Mode	Mode 1		
Date of Test	11/20/2012	Test Site	TE05

File :HE920 NA(CH1312)

Data :#1

Date: 2012/11/20

Time: 下午 03:38:57



Site: : RF Conducted

Polarization: **Conducted po**

Temperature: 23 °C

Limit: FCC Part 27 conducted(9k-26.5G)

Power: DC 3.8V

Humidity: 55.2 %

EUT: Wireless module

Distance:

RBW: 1000 KHz VBW: 1000 KHz

M/N: HE920-NA

Mode: WCDMA Band IV

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	Detector	cm	degree
1	*	2.2835	-61.41	13.06	-48.35	-13.00	-35.35	peak		Comment

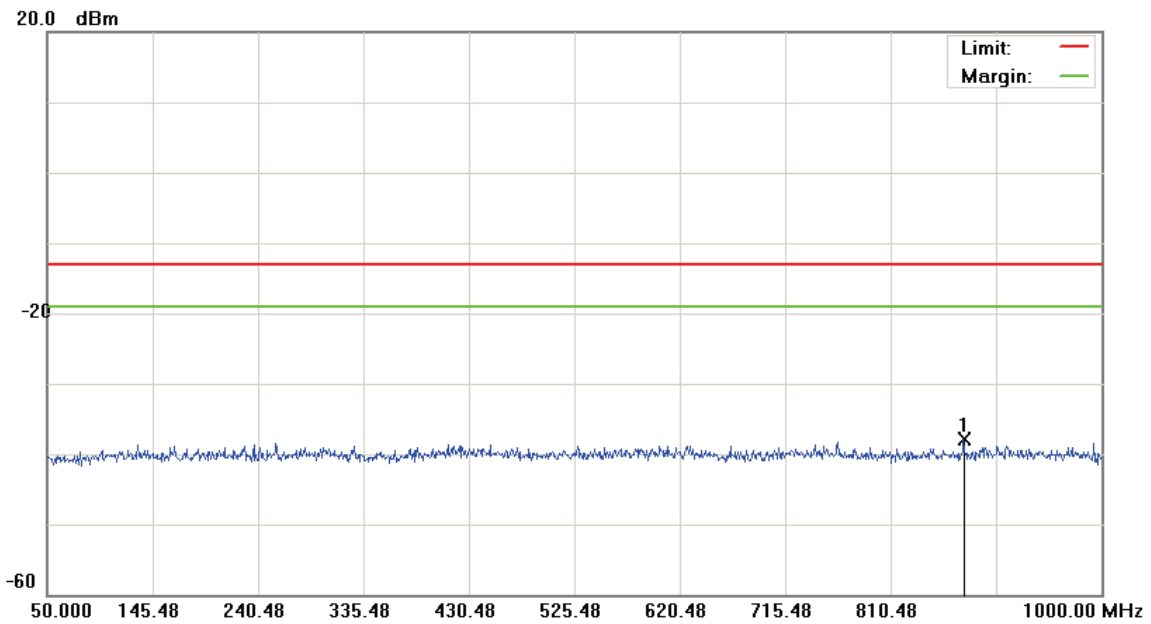
*:Maximum data x:Over limit !:over margin

File :HE920 NA(CH1312)

Data :#2

Date: 2012/11/20

Time: 下午 03:39:21



Site: : RF Conducted

Polarization: *Conducted po*

Temperature: 23 °C

Limit: FCC Part 27 conducted(9k-26.5G)

Power: DC 3.8V

Humidity: 55.2 %

EUT: Wireless module

Distance:

RBW: 1000 KHz VBW: 1000 KHz

M/N: HE920-NA

Mode: WCDMA Band IV

Note:

No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Over dB	Antenna Height cm	Table Degree degree	Comment
1	*	876.0250	-51.19	13.25	-37.94	-13.00	-24.94	peak		

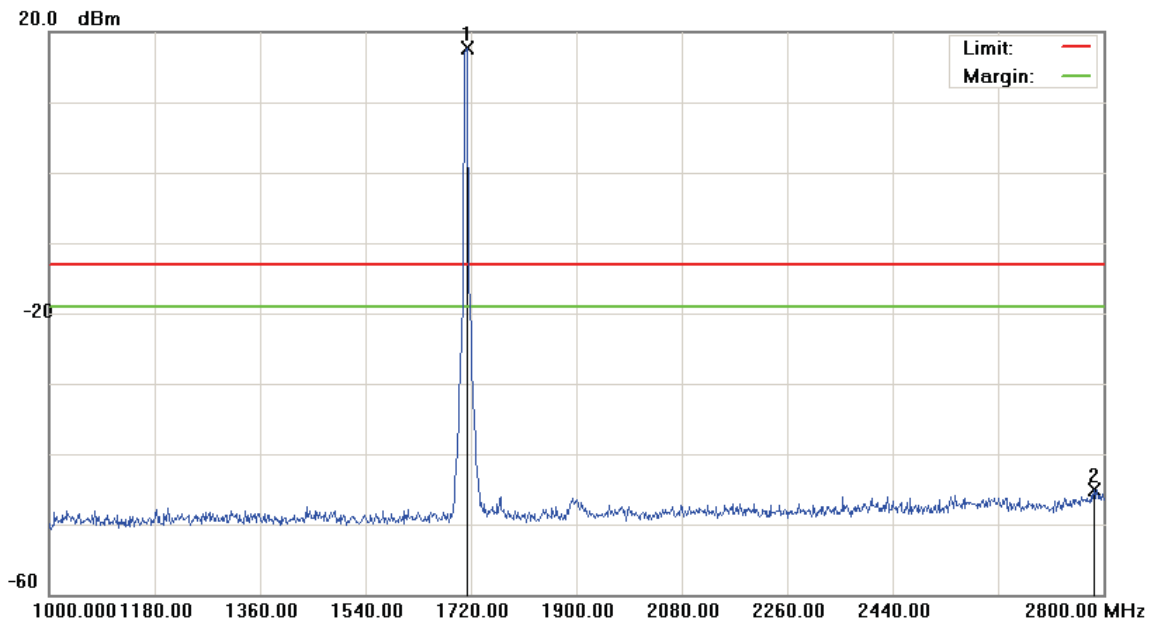
*:Maximum data x:Over limit !:over margin

File :HE920 NA(CH1312)

Data :#3

Date:2012/11/20

Time: 下午 03:46:24



Site: : RF Conducted

Polarization: *Conducted po*

Temperature: 23 °C

Limit: FCC Part 27 conducted(9k-26.5G)

Power: DC 3.8V

Humidity: 55.2 %

EUT: Wireless module

Distance:

RBW: 1000 KHz VBW: 1000 KHz

M/N: HE920-NA

Mode: WCDMA Band IV

Note:

No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Over dB	Antenna Height cm	Table Degree degree	Comment
1	*	1713.700	13.41	4.36	17.77	-13.00	30.77	peak		Tx
2		2783.800	-50.95	5.89	-45.06	-13.00	-32.06	peak		

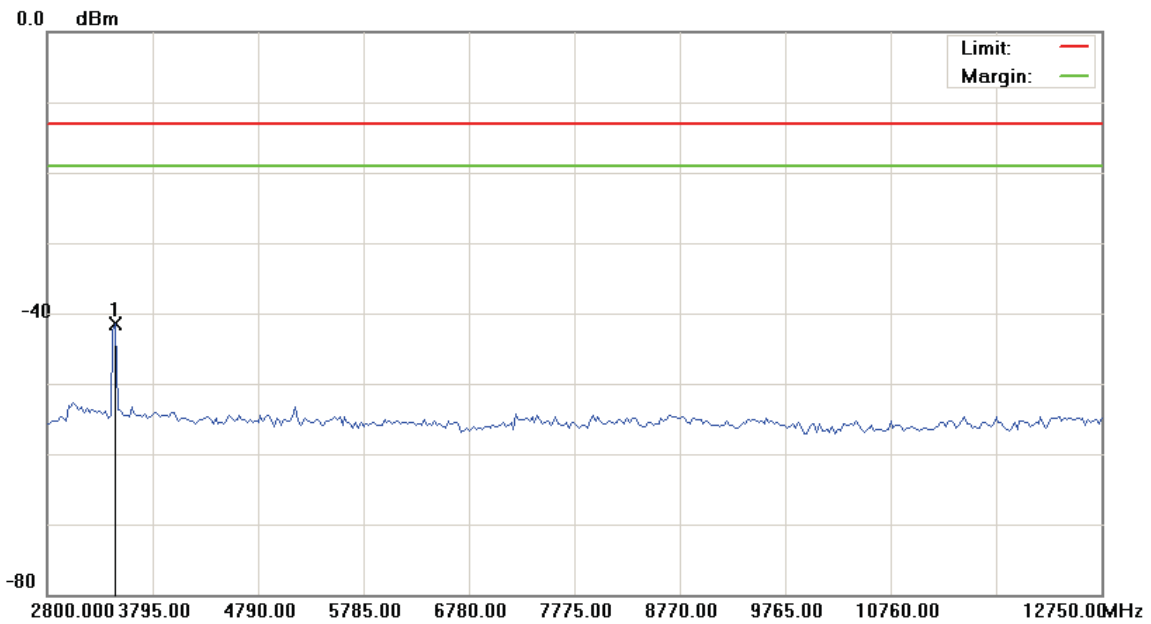
*:Maximum data x:Over limit !:over margin

File :HE920 NA(CH1312)

Data :#4

Date:2012/11/20

Time: 下午 05:14:30



Site: : RF Conducted

Polarization: *Conducted po*

Temperature: 23 °C

Limit: FCC Part 27 conducted(9k-26.5G)

Power: DC 3.8V

Humidity: 55.2 %

EUT: Wireless module

Distance:

RBW: 1000 KHz VBW: 1000 KHz

M/N: HE920-NA

Mode: WCDMA Band IV

Note:

No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Over dB	Antenna Height cm	Table Degree degree	Comment
1	*	3446.750	-46.57	5.08	-41.49	-13.00	-28.49	peak		

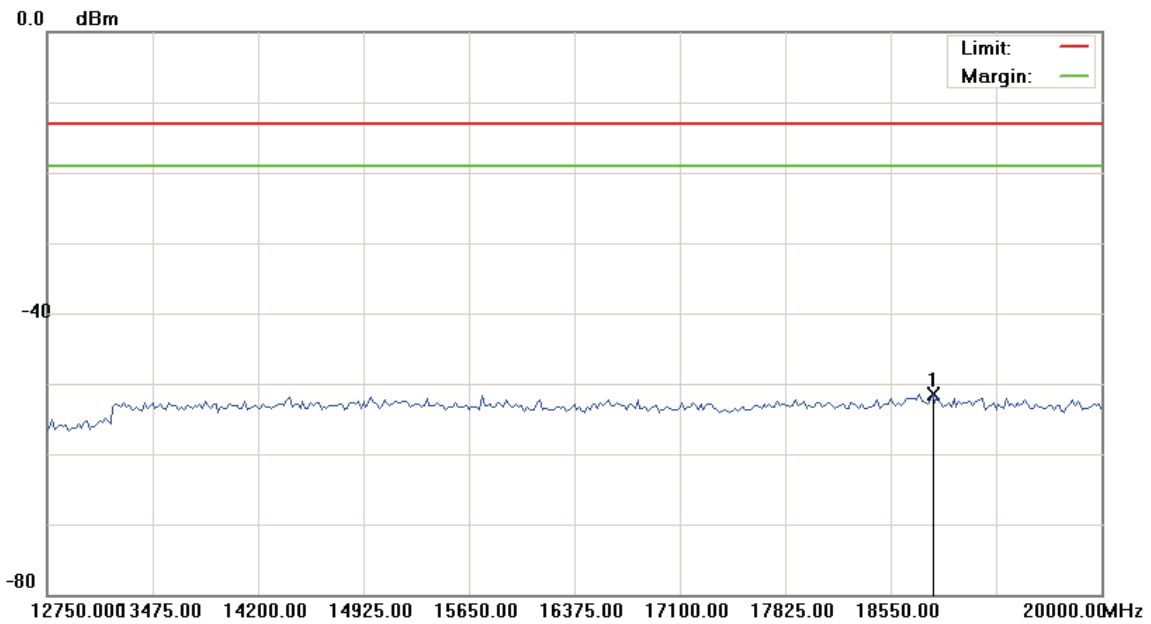
*:Maximum data x:Over limit !:over margin

File :HE920 NA(CH1312)

Data :#5

Date:2012/11/20

Time: 下午 05:14:49



Site: : RF Conducted

Polarization: *Conducted po*

Temperature: 23 °C

Limit: FCC Part 27 conducted(9k-26.5G)

Power: DC 3.8V

Humidity: 55.2 %

EUT: Wireless module

Distance:

RBW: 1000 KHz VBW: 1000 KHz

M/N: HE920-NA

Mode: WCDMA Band IV

Note:

No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Over dB	Antenna Height cm	Table Degree degree	Comment
1	*	18840.000	-58.66	7.11	-51.55	-13.00	-38.55	peak		

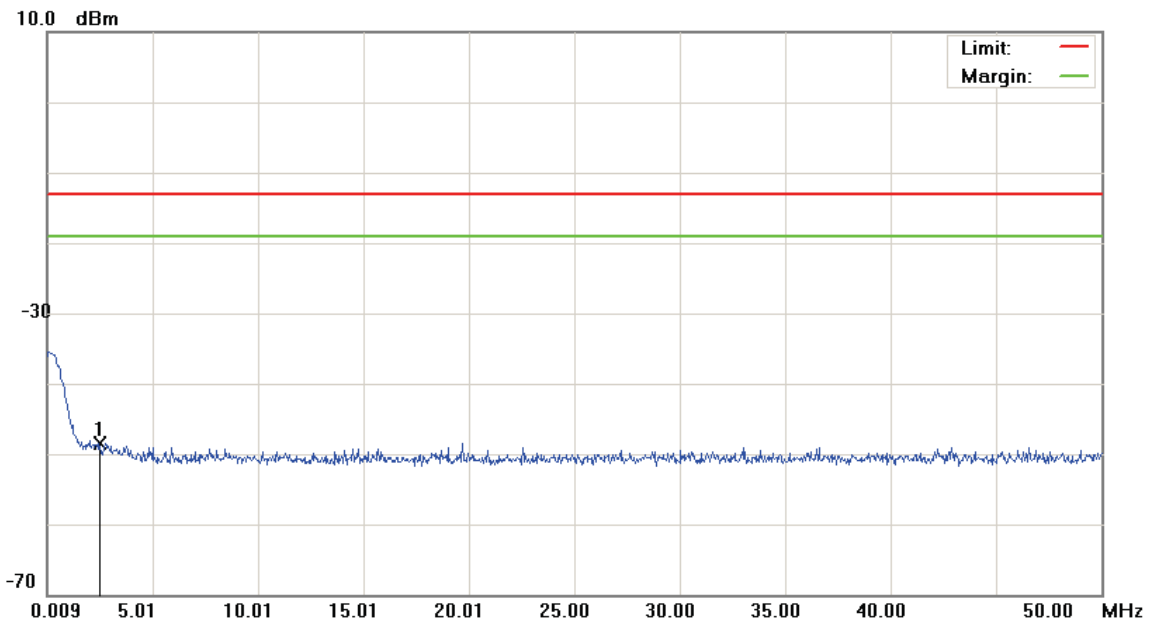
*:Maximum data x:Over limit !:over margin

File :HE920 NA(CH1450)

Data :#1

Date:2012/11/20

Time: 下午 03:40:39



Site: : RF Conducted

Polarization: **Conducted po**

Temperature: 23 °C

Limit: FCC Part 27 conducted(9k-26.5G)

Power: DC 3.8V

Humidity: 55.2 %

EUT: Wireless module

Distance:

RBW: 1000 KHz VBW: 1000 KHz

M/N: HE920-NA

Mode: WCDMA Band IV

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	Detector	cm	degree
1	*	2.4836	-61.39	12.91	-48.48	-13.00	-35.48	peak		Comment

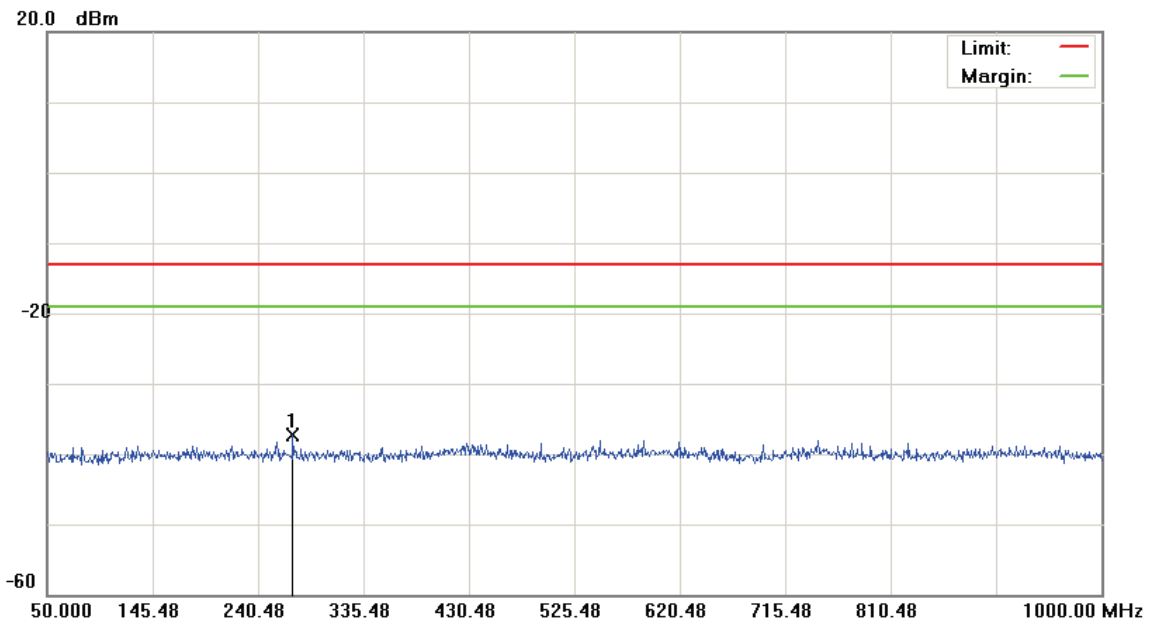
*:Maximum data x:Over limit !:over margin

File :HE920 NA(CH1450)

Data :#2

Date:2012/11/20

Time: 下午 03:41:03



Site: : RF Conducted

Polarization: **Conducted po**

Temperature: 23 °C

Limit: FCC Part 27 conducted(9k-26.5G)

Power: DC 3.8V

Humidity: 55.2 %

EUT: Wireless module

Distance:

RBW: 1000 KHz VBW: 1000 KHz

M/N: HE920-NA

Mode: WCDMA Band IV

Note:

No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Over dB	Antenna Height cm	Table Degree	Comment
1	*	271.3500	-50.63	13.31	-37.32	-13.00	-24.32	peak		

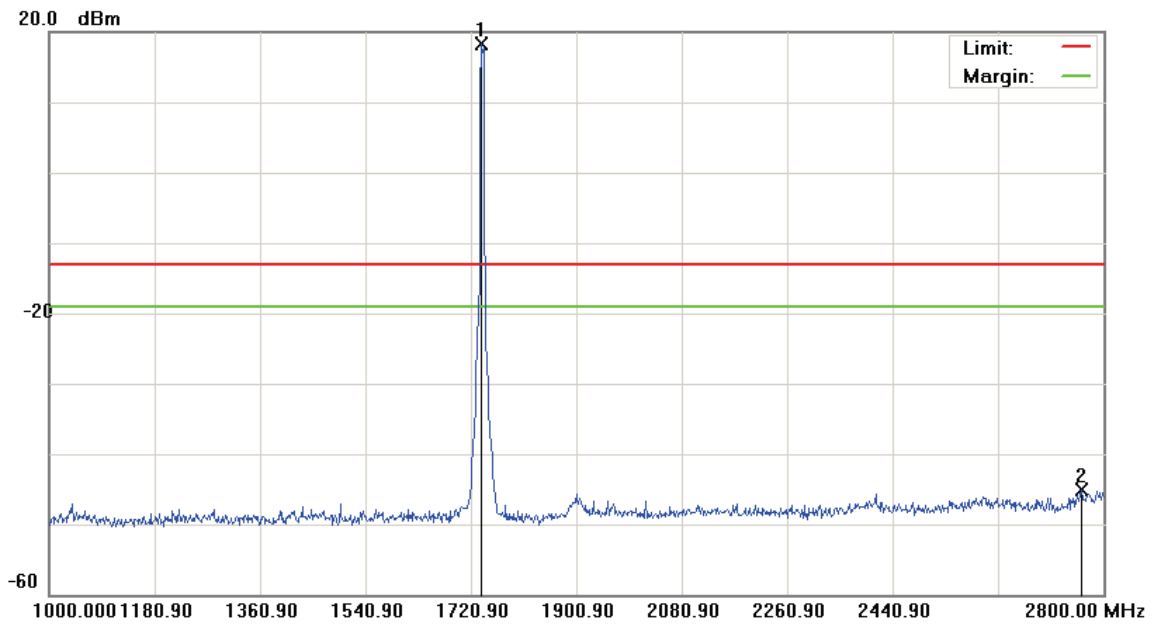
*:Maximum data x:Over limit !:over margin

File :HE920 NA(CH1450)

Data :#3

Date:2012/11/20

Time: 下午 03:47:41



Site: : RF Conducted

Polarization: **Conducted po**

Temperature: 23 °C

Limit: FCC Part 27 conducted(9k-26.5G)

Power: DC 3.8V

Humidity: 55.2 %

EUT: Wireless module

Distance:

RBW: 1000 KHz VBW: 1000 KHz

M/N: HE920-NA

Mode: WCDMA Band IV

Note:

No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Over dB	Antenna Height cm	Table Degree degree	Comment
1	*	1738.000	13.74	4.65	18.39	-13.00	31.39	peak		Tx
2		2762.200	-50.67	5.63	-45.04	-13.00	-32.04	peak		

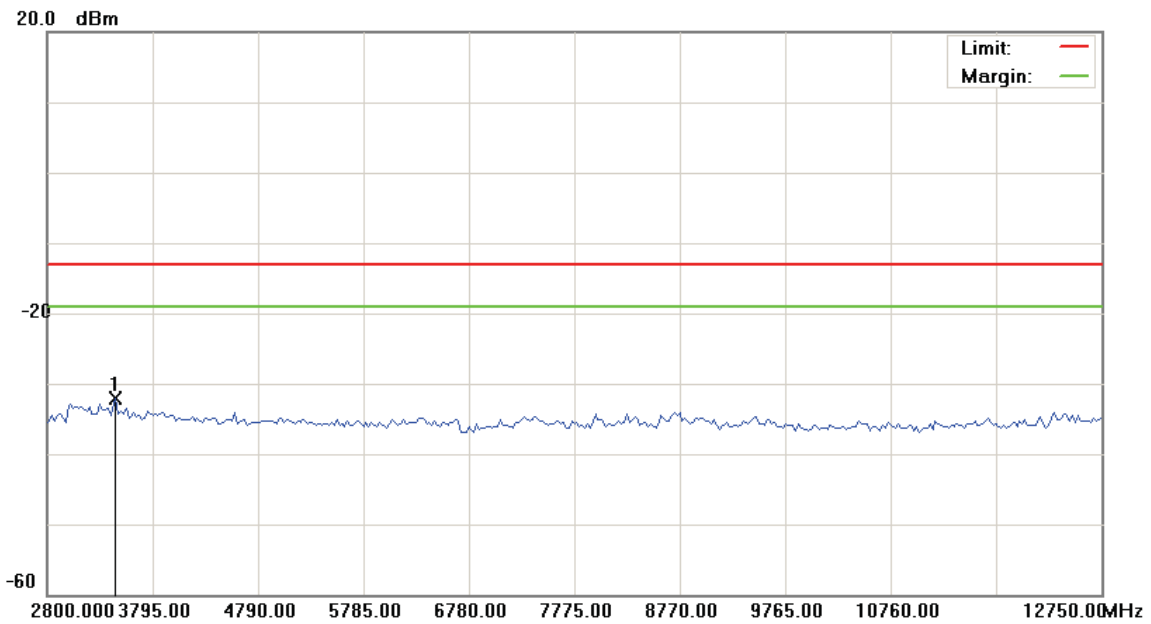
*:Maximum data x:Over limit !:over margin

File :HE920 NA(CH1450)

Data :#4

Date:2012/11/20

Time: 下午 05:16:57



Site: : RF Conducted

Polarization: *Conducted po*

Temperature: 23 °C

Limit: FCC Part 27 conducted(9k-26.5G)

Power: DC 3.8V

Humidity: 55.2 %

EUT: Wireless module

Distance:

RBW: 1000 KHz VBW: 1000 KHz

M/N: HE920-NA

Mode: WCDMA Band IV

Note:

No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Over dB	Antenna Height cm	Table Degree degree	Comment
1	*	3446.750	-37.22	5.08	-32.14	-13.00	-19.14	peak		

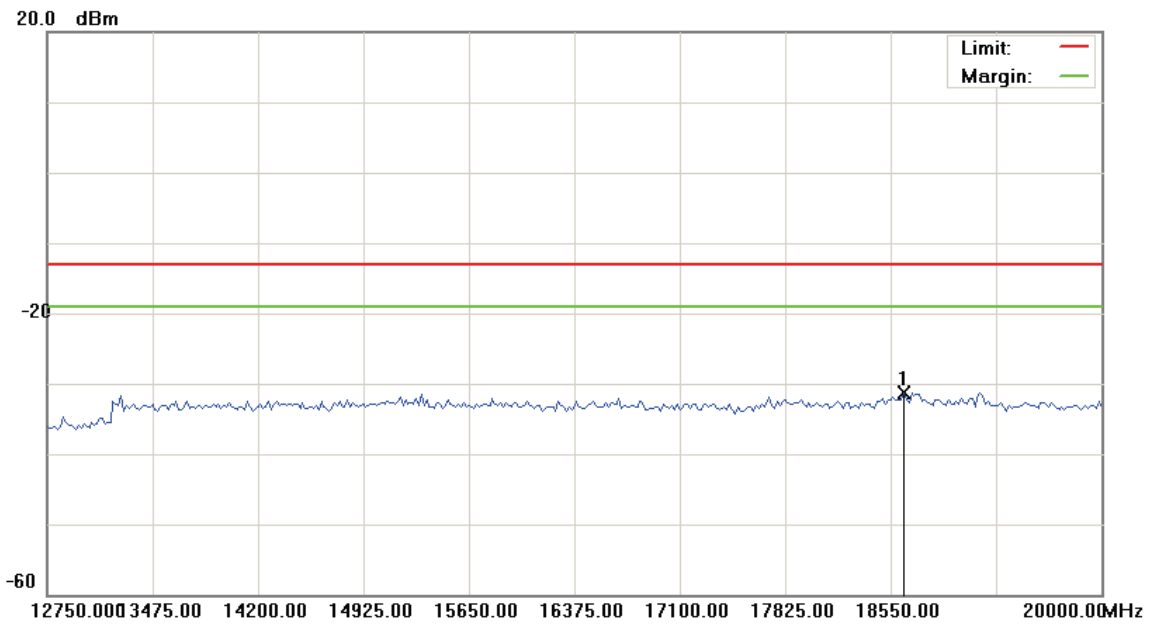
*:Maximum data x:Over limit !:over margin

File :HE920 NA(CH1450)

Data :#5

Date:2012/11/20

Time: 下午 05:17:17



Site: : RF Conducted

Polarization: Conducted po

Temperature: 23 °C

Limit: FCC Part 27 conducted(9k-26.5G)

Power: DC 3.8V

Humidity: 55.2 %

EUT: Wireless module

Distance:

RBW: 1000 KHz VBW: 1000 KHz

M/N: HE920-NA

Mode: WCDMA Band IV

Note:

No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Over dB	Antenna Height cm	Table Degree degree	Comment
1	*	18640.625	-38.39	7.05	-31.34	-13.00	-18.34	peak		

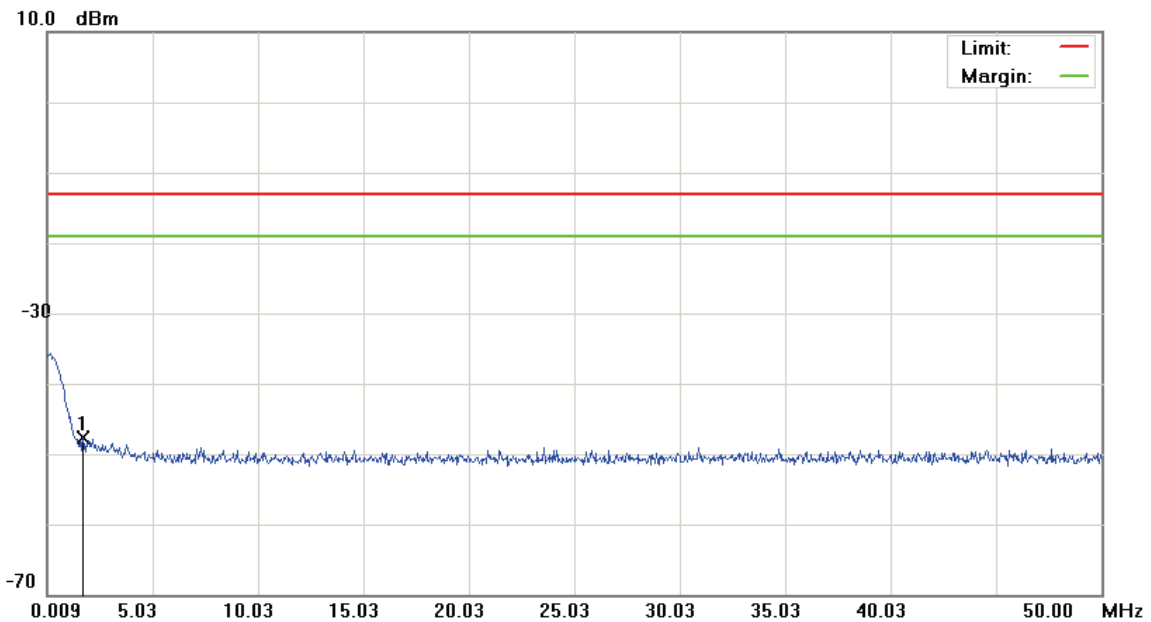
*:Maximum data x:Over limit !:over margin

File :HE920 NA(CH1513)

Data :#1

Date:2012/11/20

Time: 下午 03:43:55



Site: : RF Conducted

Polarization: **Conducted po**

Temperature: 23 °C

Limit: FCC Part 27 conducted(9k-26.5G)

Power: DC 3.8V

Humidity: 55.2 %

EUT: Wireless module

Distance:

RBW: 1000 KHz VBW: 1000 KHz

M/N: HE920-NA

Mode: WCDMA Band IV

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBm	dB	dBm	dBm	dB	cm	degree	Comment
1	*	1.7087	-60.30	12.57	-47.73	-13.00	-34.73	peak		

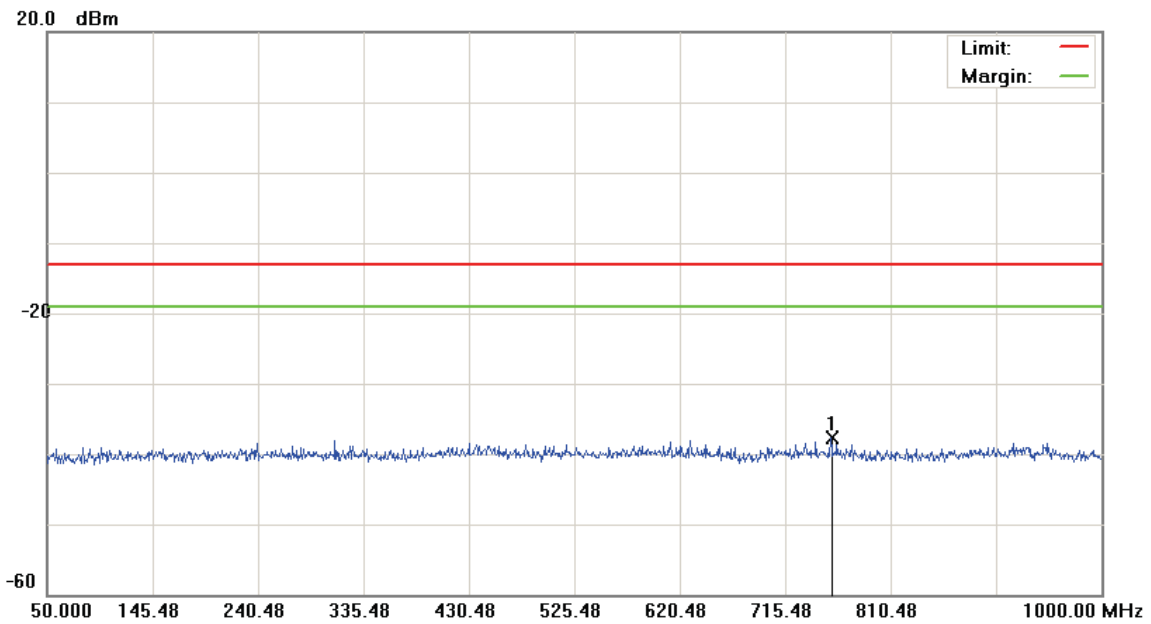
*:Maximum data x:Over limit !:over margin

File :HE920 NA(CH1513)

Data :#2

Date:2012/11/20

Time: 下午 03:44:19



Site: : RF Conducted

Polarization: *Conducted po*

Temperature: 23 °C

Limit: FCC Part 27 conducted(9k-26.5G)

Power: DC 3.8V

Humidity: 55.2 %

EUT: Wireless module

Distance:

RBW: 1000 KHz VBW: 1000 KHz

M/N: HE920-NA

Mode: WCDMA Band IV

Note:

No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Over dB	Antenna Height cm	Table Degree	Comment
1	*	756.3250	-50.91	13.16	-37.75	-13.00	-24.75	peak		

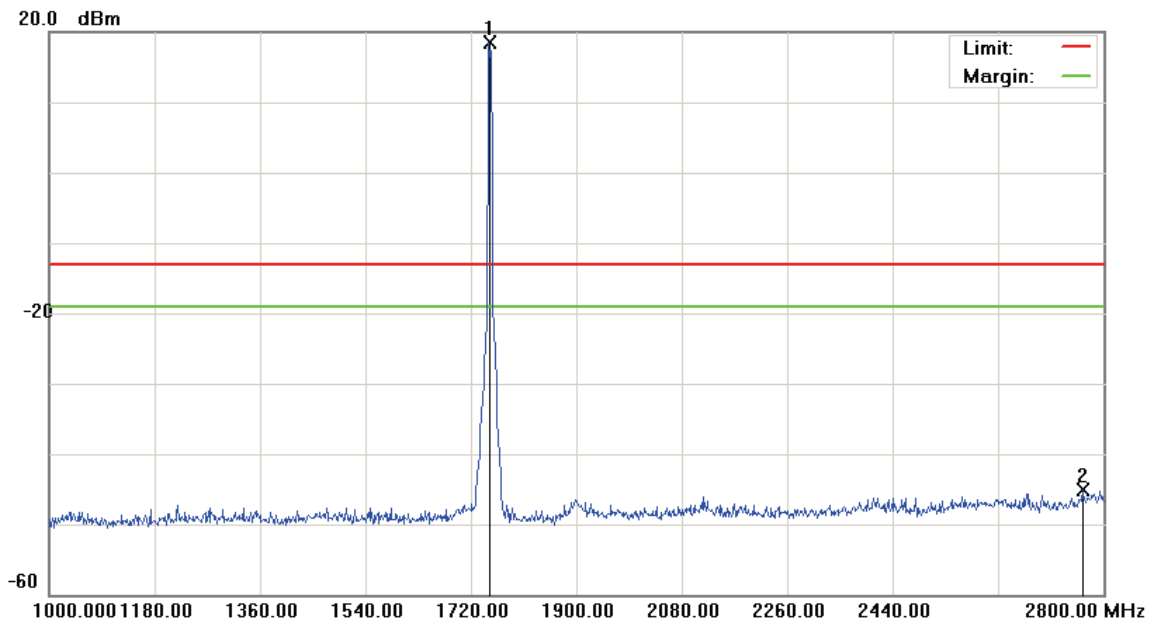
*:Maximum data x:Over limit !:over margin

File :HE920 NA(CH1513)

Data :#3

Date: 2012/11/20

Time: 下午 03:48:52



Site: : RF Conducted

Polarization: *Conducted po*

Temperature: 23 °C

Limit: FCC Part 27 conducted(9k-26.5G)

Power: DC 3.8V

Humidity: 55.2 %

EUT: Wireless module

Distance:

RBW: 1000 KHz VBW: 1000 KHz

M/N: HE920-NA

Mode: WCDMA Band IV

Note:

No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Over dB	Antenna Height cm	Table Degree degree	Comment
1	*	1751.500	13.93	4.63	18.56	-13.00	31.56	peak		Tx
2		2764.000	-50.69	5.66	-45.03	-13.00	-32.03	peak		

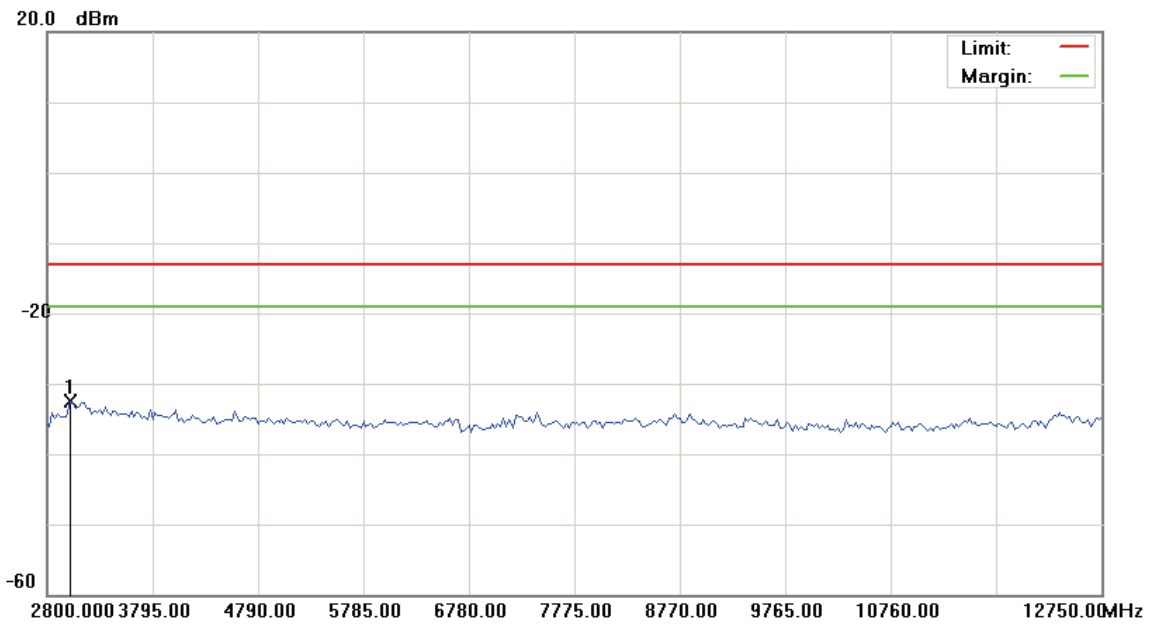
*:Maximum data x:Over limit !:over margin

File :HE920 NA(CH1513)

Data :#4

Date:2012/11/20

Time: 下午 05:17:52



Site: : RF Conducted

Polarization: **Conducted po**

Temperature: 23 °C

Limit: FCC Part 27 conducted(9k-26.5G)

Power: DC 3.8V

Humidity: 55.2 %

EUT: Wireless module

Distance:

RBW: 1000 KHz VBW: 1000 KHz

M/N: HE920-NA

Mode: WCDMA Band IV

Note:

No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Over dB	Antenna Height cm	Table Degree degree	Comment
1	*	3023.875	-37.91	5.48	-32.43	-13.00	-19.43	peak		

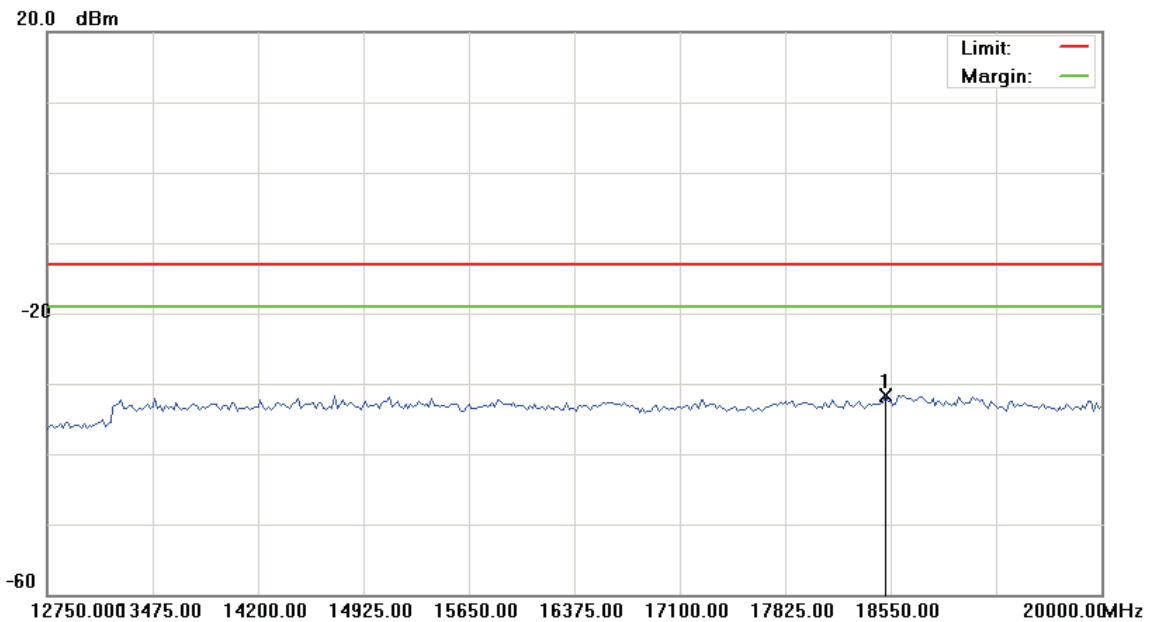
*:Maximum data x:Over limit !:over margin

File :HE920 NA(CH1513)

Data :#5

Date:2012/11/20

Time: 下午 05:18:12



Site: : RF Conducted

Polarization: *Conducted po*

Temperature: 23 °C

Limit: FCC Part 27 conducted(9k-26.5G)

Power: DC 3.8V

Humidity: 55.2 %

EUT: Wireless module

Distance:

RBW: 1000 KHz VBW: 1000 KHz

M/N: HE920-NA

Mode: WCDMA Band IV

Note:

No.	Mk.	Freq. MHz	Reading Level dBm	Correct Factor dB	Measure- ment dBm	Limit dBm	Over dB	Antenna Height cm	Table Degree degree	Comment
1	*	18513.750	-38.71	7.02	-31.69	-13.00	-18.69	peak		

*:Maximum data x:Over limit !:over margin

7 Field Strength of Spurious Radiation Test

7.1. Limit

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.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

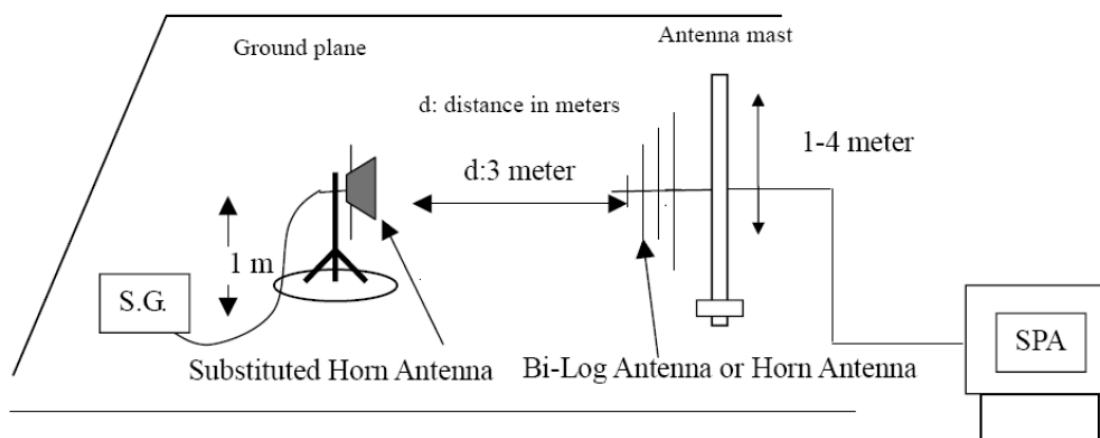
7.2. Test Instruments

3 Meter Chamber					
Equipment	Manufacturer	Model Number	Serial No.	Cal. Date	Remark
RF Pre-selector	Agilent	N9039A	MY46520256	01/21/2013	(1)
Spectrum Analyzer	Agilent	E4446A	MY46180578	01/21/2013	(1)
Pre Amplifier	Agilent	8449B	3008A02237	02/22/2012	(1)
Pre Amplifier	Agilent	8447D	2944A10961	02/22/2012	(1)
Broadband Antenna (30MHz~1GHz)	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	9163-270	06/29/2012	(1)
Horn Antenna (1~18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	9120D-550	06/15/2012	(1)
Horn Antenna (18~40GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9170	9170-320	06/21/2012	(1)
Test Site	ATL	TE01	888001	12/20/2011	(1)

Remark: ⁽¹⁾ Calibration period 1 year. ⁽²⁾ Calibration period 2 years.

Note: N.C.R. = No Calibration Request.

7.3. Setup



7.4. Test Procedure

The measurement is made according to ANSI/TIA-603-C-2004 as follows:

The equipment under test is placed inside the semi-anechoic chamber on a wooden table at the turntable center. For each spurious frequency, the antenna mast is raised and lowered from 1 to 4 meters and the turntable is rotated 360 degrees to obtain a maximum reading on the spectrum analyzer. This is repeated for both horizontal and vertical polarizations of the receive antenna.

The equipment under test is then replaced with a substitution antenna fed by a signal generator. With the signal generator tuned to a particular spurious frequency, the antenna mast is raised and lowered from 1 to 4 meters to obtain a maximum reading at the spectrum analyzer. The output of the signal generator is then adjusted until a reading identical to that obtained with the actual transmitter is achieved.

The power in dBm of each spurious emission is calculated by correcting the signal generator level for cable loss and gain of the substitution antenna referenced to a dipole. A fully charged battery was used for the supply voltage.

The settings of the receiver were as follows:

Units	dBm
Resolution Bandwidth	1 MHz
Video Bandwidth	Auto
Sweep Time	Auto

7.5. Uncertainty

The measurement uncertainty is defined as for Field Strength of Spurious Radiation measurement is ± 3.072 dB.

7.6. Test Result

Standard:	FCC Part 27	Test Distance:	3m
Test item:	Radiated Emission	Power:	DC 3.8V
Model Number:	HE920-NA	Temp.(°C)/Hum.(%RH):	23(°C)/55.2%RH
Mode:	1	Date:	02/07/2013
Frequency:	1712.4 MHz	Test By:	Fly Lu

Frequency (MHz)	Reading (dBm)	Correct Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
126.0000	-65.85	-5.04	-70.89	-13.00	-57.89	peak	H
227.0000	-70.51	-0.80	-71.31	-13.00	-58.31	peak	H
410.0000	-73.03	3.00	-70.03	-13.00	-57.03	peak	H
567.0000	-78.99	7.74	-71.25	-13.00	-58.25	peak	H
702.0000	-78.28	7.00	-71.28	-13.00	-58.28	peak	H
880.5000	-79.99	13.23	-66.76	-13.00	-53.76	peak	H
3172.000	-69.89	18.20	-51.69	-13.00	-38.69	peak	H
5452.000	-73.22	25.83	-47.39	-13.00	-34.39	peak	H
7552.000	-73.07	33.77	-39.30	-13.00	-26.30	peak	H
126.0000	-71.36	10.40	-60.96	-13.00	-47.96	peak	V
250.0000	-74.48	-0.92	-75.40	-13.00	-62.40	peak	V
370.0000	-75.44	2.03	-73.41	-13.00	-60.41	peak	V
520.0000	-76.92	3.11	-73.81	-13.00	-60.81	peak	V
617.0000	-79.56	8.68	-70.88	-13.00	-57.88	peak	V
859.0000	-80.90	11.60	-69.30	-13.00	-56.30	peak	V
3172.000	-68.56	21.21	-47.35	-13.00	-34.35	peak	V
5344.000	-72.81	27.62	-45.19	-13.00	-32.19	peak	V
7444.000	-72.36	31.02	-41.34	-13.00	-28.34	peak	V

Standard:	FCC Part 27	Test Distance:	3m
Test item:	Radiated Emission	Power:	DC 3.8V
Model Number:	HE920-NA	Temp.(°C)/Hum.(%RH):	23(°C)/55.2%RH
Mode:	1	Date:	02/07/2013
Frequency:	1740.0 MHz	Test By:	Fly Lu

Frequency (MHz)	Reading (dBm)	Correct Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
126.0000	-66.59	-5.04	-71.63	-13.00	-58.63	peak	H
306.0000	-75.43	-1.92	-77.35	-13.00	-64.35	peak	H
450.0000	-76.20	4.27	-71.93	-13.00	-58.93	peak	H
580.0000	-78.61	7.60	-71.01	-13.00	-58.01	peak	H
702.0000	-79.83	7.00	-72.83	-13.00	-59.83	peak	H
828.0000	-79.38	11.99	-67.39	-13.00	-54.39	peak	H
3196.000	-68.68	18.27	-50.41	-13.00	-37.41	peak	H
5392.000	-72.86	25.55	-47.31	-13.00	-34.31	peak	H
7852.000	-72.86	33.70	-39.16	-13.00	-26.16	peak	H
134.5000	-73.82	11.93	-61.89	-13.00	-48.89	peak	V
260.0000	-67.21	-1.56	-68.77	-13.00	-55.77	peak	V
410.0000	-78.78	1.34	-77.44	-13.00	-64.44	peak	V
578.5000	-78.88	5.80	-73.08	-13.00	-60.08	peak	V
746.5000	-80.00	10.64	-69.36	-13.00	-56.36	peak	V
911.5000	-81.04	11.33	-69.71	-13.00	-56.71	peak	V
3124.000	-68.98	20.95	-48.03	-13.00	-35.03	peak	V
5248.000	-72.38	27.47	-44.91	-13.00	-31.91	peak	V
7492.000	-72.75	31.07	-41.68	-13.00	-28.68	peak	V

Standard:	FCC Part 27	Test Distance:	3m
Test item:	Radiated Emission	Power:	DC 3.8V
Model Number:	HE920-NA	Temp.(°C)/Hum.(%RH):	23(°C)/55.2%RH
Mode:	1	Date:	02/07/2013
Frequency:	1752.6 MHz	Test By:	Fly Lu

Frequency (MHz)	Reading (dBm)	Correct Factor (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Remark	Ant.Polar. H / V
159.5000	-65.57	1.30	-64.27	-13.00	-51.27	peak	H
240.0000	-71.65	-2.09	-73.74	-13.00	-60.74	peak	H
400.0000	-75.95	2.55	-73.40	-13.00	-60.40	peak	H
531.5000	-78.76	8.01	-70.75	-13.00	-57.75	peak	H
702.0000	-78.29	7.00	-71.29	-13.00	-58.29	peak	H
876.5000	-80.29	13.18	-67.11	-13.00	-54.11	peak	H
3100.000	-68.92	18.01	-50.91	-13.00	-37.91	peak	H
5332.000	-72.54	25.28	-47.26	-13.00	-34.26	peak	H
7300.000	-73.07	33.33	-39.74	-13.00	-26.74	peak	H
138.5000	-74.74	9.75	-64.99	-13.00	-51.99	peak	V
226.0000	-73.45	3.44	-70.01	-13.00	-57.01	peak	V
350.0000	-78.16	1.81	-76.35	-13.00	-63.35	peak	V
507.0000	-79.32	2.87	-76.45	-13.00	-63.45	peak	V
680.0000	-78.00	9.56	-68.44	-13.00	-55.44	peak	V
830.0000	-79.53	11.31	-68.22	-13.00	-55.22	peak	V
2992.000	-69.94	20.17	-49.77	-13.00	-36.77	peak	V
5284.000	-71.59	27.54	-44.05	-13.00	-31.05	peak	V
7612.000	-72.65	30.94	-41.71	-13.00	-28.71	peak	V

Standard:	RSS-Gen	Test Distance:	3m
Test item:	Radiated Emission	Power:	DC 3.8V
Model Number:	HE920-NA	Temp.(°C)/Hum.(%RH):	23(°C)/55.2%RH
Mode:	2	Date:	02/07/2013
		Test By:	Fly Lu

Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Polar. H / V
2504.500	37.39	4.63	42.02	74.00	-31.98	peak	H
4442.500	36.26	10.68	46.94	74.00	-27.06	peak	H
6431.500	34.75	17.20	51.95	74.00	-22.05	peak	H
2479.000	37.16	4.49	41.65	74.00	-32.35	peak	V
4570.000	36.63	11.06	47.69	74.00	-26.31	peak	V
6278.500	35.26	16.73	51.99	74.00	-22.01	peak	V

8 Frequency Stability (Temperature & Voltage Variation) Test

8.1. Limit

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ ($\pm 2.5\text{ppm}$) of the center frequency.

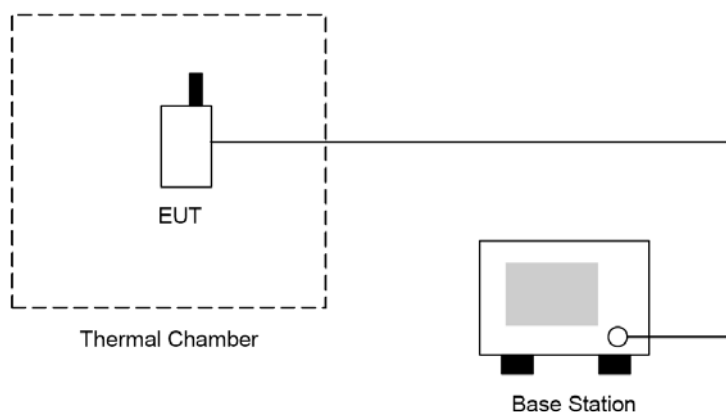
8.2. Test Instruments

Equipment	Manufacturer	Model Number	Serial No.	Cal. Date	Remark
Universal Radio Communication Tester	R & S	CMU200	109369	08/07/2012	(2)
Temperature & Humidity Chamber	TAICHY	MHU-225LA	980729	08/07/2012	(1)
Test Site	ATL	TE05	TE05	N.C.R.	-----

Remark: ⁽¹⁾ Calibration period 1 year. ⁽²⁾ Calibration period 2 years.

Note: N.C.R. = No Calibration Request.

8.3. Setup



8.4. Test Procedure

The measurement is made according to FCC rules part 22 and 24:

1. The EUT and test equipment were set up as shown on the following section.
2. With all power removed, the temperature was decreased to -30°C and permitted to stabilize for three hours. Power was applied and the maximum change in frequency was note within one minute.
3. With power OFF, the temperature was raised in 10°C steps. The sample was permitted to stabilize at each step for at least one-half hour. Power was applied and the maximum frequency change was noted within one minute.
4. The EUT was placed in a temperature chamber at $25 \pm 5^{\circ}\text{C}$ and connected as the following section.
5. The power supply voltage to the EUT was varied from BEP to 115% of the nominal value measured at the input to the EUT.
6. The temperature tests were performed for the worst case.
7. Test data was recorded.

8.5. Uncertainty

The measurement uncertainty is defined as for Frequency Stability (Temperature Variation) measurement is $\pm 10\text{Hz}$.

8.6. Test Result

Model Number	HE920-NA					
Test Item	Frequency Stability (Temperature & Voltage Variation)					
Test Mode	Mode 1					
Date of Test	11/20/2012				Test Site	TE05
Level	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Result
Normal	3.80	-20	-21	-0.012	± 2.5	Pass
Normal	3.80	-10	-24	-0.014	± 2.5	Pass
Normal	3.80	0	-31	-0.018	± 2.5	Pass
Normal	3.80	10	10	0.006	± 2.5	Pass
Battery full point	4.20	20	-9	-0.005	± 2.5	Pass
Normal	3.80	20	-17	-0.010	± 2.5	Pass
Battery cut-off point	3.40	20	-14	-0.008	± 2.5	Pass
Normal	3.80	30	-18	-0.010	± 2.5	Pass
Normal	3.80	40	-31	-0.018	± 2.5	Pass
Normal	3.80	50	18	0.010	± 2.5	Pass
Normal	3.80	55	11	0.006	± 2.5	Pass

Note: This device operating temperature range is $-20^{\circ}\text{C} \sim +55^{\circ}\text{C}$.