



# FCC Test Report

## FCC Part22H & 24E & 27 F&L&M

Product Name : Module  
Model No. : AR7582-1  
FCC ID : N7NAR7582V1  
IC : 2417C-AR7582V1

Applicant : Sierra Wireless Inc

Address : 13811 Wireless Way, Richmond, BC, V6V 3A4 Canada

Date of Receipt : Nov. 16, 2017  
Test Date : Nov. 17, 2017~ Dec. 07, 2017  
Issued Date : Dec. 19, 2017  
Report No. : 17B2100R-HP-US-P07V01  
Report Version : V1.0

The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration of the equipment and evaluated measurement uncertainty herein.

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# Test Report Certification

Issued Date : Dec. 19, 2017

Report No. :17B2100R-HP-US-P07V01



Product Name : Module  
 Applicant : Sierra Wireless Inc  
 Address : 13811 Wireless Way, Richmond, BC, V6V 3A4 Canada  
 Manufacturer : Sierra Wireless Inc  
 Address : 13811 Wireless Way, Richmond, BC, V6V 3A4 Canada  
 Model No. : AR7582-1  
 FCC ID : N7NAR7582V1  
 IC : 2417C-AR7582V1  
 EUT Voltage : Low: 3.3V, High: 4.2V, Normal: 3.7V  
 Applicable Standard : FCC CFR Title 47 Part 2,  
 FCC Part22 Subpart H  
 FCC Part24 Subpart E  
 FCC Part 27 Subpart L&F&M  
 TIA/EIA 603-D  
 KDB971168  
 ANSI 63.26: 2015  
 Industry Canada RSS-GEN, Issue 4  
 Industry Canada RSS-132, Issue 3  
 Industry Canada RSS-133, Issue 6  
 Industry Canada RSS-139, Issue 3  
 Industry Canada RSS-130, Issue 1

Test Result : Complied  
 Performed Location : DEKRA Testing and Certification (Suzhou) Co., Ltd.  
 No.99 Hongye Rd., Suzhou Industrial Park, Suzhou,215006,  
 Jiangsu,China  
 TEL:+86-512-6251-5088 / FAX:+86-512-6251-5098  
 FCC Designation Number: CN1199

Documented By : Kitty Li  
 (Adm. Specialist: Kitty Li)

Reviewed By : Frank He  
 (Senior Engineer: Frank He)

Approved By : Harry Zhao  
 (Engineering Manager: Harry Zhao)

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### History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
17B2100R-HP-US-P07V01	V1.0	Initial Issued Report	Dec. 19, 2017

## 1. General Information

### 1.1. EUT Description

Product Name	Module
Model No.	AR7582-1
EUT Voltage	Low: 3.3V, High: 4.2V, Normal: 3.7V
HW	1.0
SW	SWI9X28A_00.10.02.00
<b>2G</b>	
Support Band	GSM850/PCS1900
Uplink	GSM 850: 824~849MHz PCS 1900: 1850~1910MHz
Downlink	GSM 850: 869~894MHz PCS 1900: 1930~1990MHz
Type of modulation	GMSK for GPRS; 8PSK for EDGE
<b>3G</b>	
Support Band	WCDMA Band 2/WCDMA Band 5/WCDMA Band 4
Uplink	WCDMA Band 2: 1850~1910MHz WCDMA Band 4:1710~1755MHz WCDMA Band 5: 824~849MHz
Downlink	WCDMA Band 2: 1930~1990MHz WCDMA Band 4:2110~2155MHz WCDMA Band 5: 869~894MHz
Type of modulation	QPSK for Uplink
<b>4G</b>	
Support Band	LTE Band 2/4/5/12/13/17
Uplink	Band 2: 1850-1910MHz Band 4: 1710~1755MHz Band 5: 824-849MHz Band 12: 699~716MHz Band 13: 777-787MHz Band 17: 704-716MHz
Downlink	Band 2: 1930-1990MHz Band 4: 2110~2155MHz Band 5: 869-894MHz Band 12:729~746MHz

	Band 13: 746-756MHz Band 17: 734-746MHz
Type of modulation	QPSK, 16QAM
Antenna Type	Dipole
Antenna Gain	GSM 850: 1.2dBi PCS 1900:1.3dBi WCDMA Band 2:1.3dBi WCDMA Band 5:1.2dBi Band 2:1.3dBi Band 4: 1.3dBi Band 5: 1.2dBi Band 12: 1.2dBi Band 13: 1.2dBi Band 17: 1.2dBi

## 1.2. Mode of Operation

We have 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:

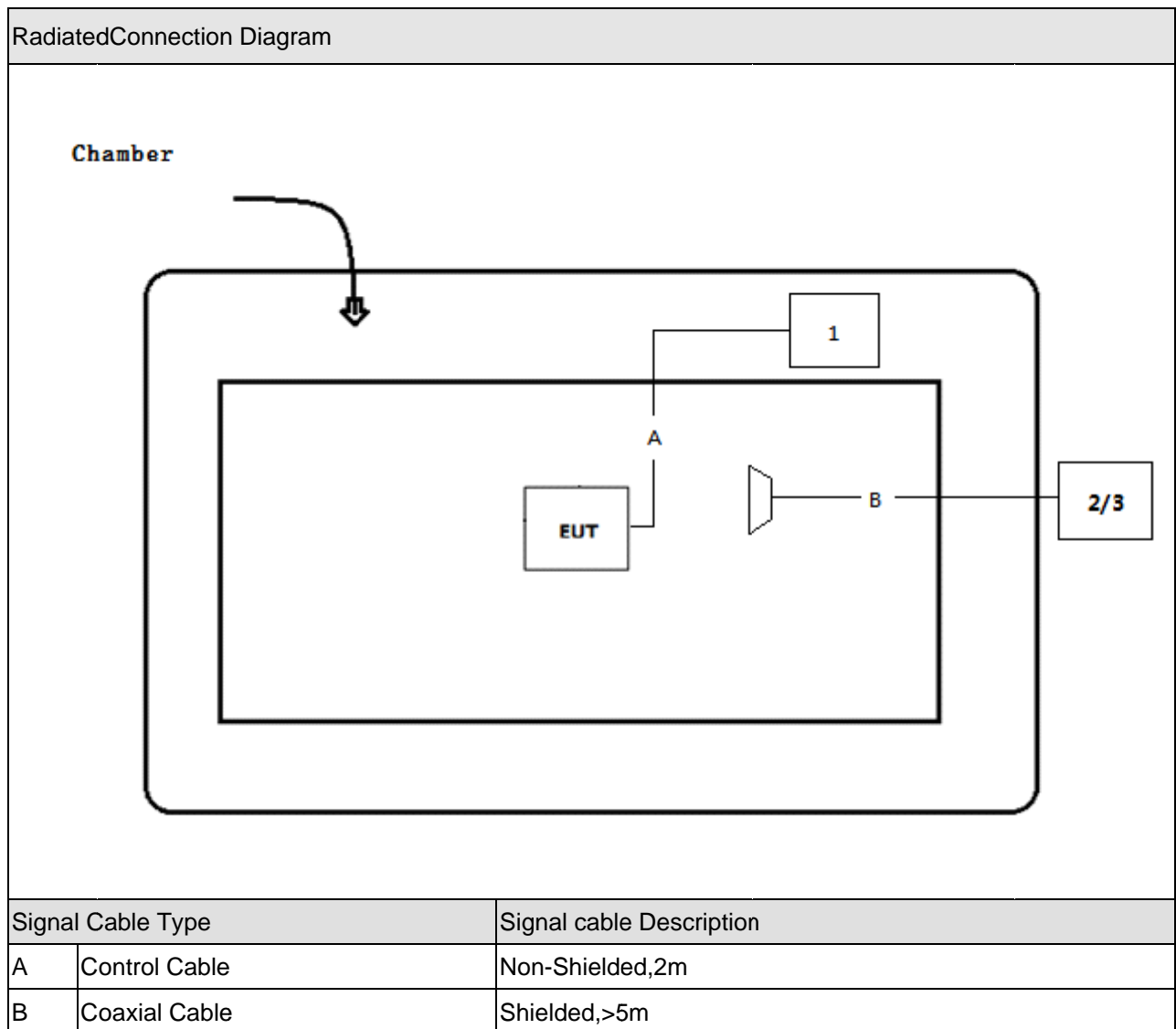
Test Mode
Mode 1 :GSM 850 Link
Mode 2 :PCS 1900 Link
Mode 3 : WCDMA Band 2 Link
Mode 4 : WCDMA Band 4 Link
Mode 5 : WCDMA Band 5 Link
Mode 6 :LTE Band 2 Link
Mode 7 :LTE Band 4 Link
Mode 8 :LTE Band 5 Link
Mode 9 : LTE Band 12 Link
Mode 10:LTE Band 13 Link
Mode 11:LTE Band 17 Link
Note 1: The maximum power of GPRS and EDGE of all multi-slot modes are GPRS-1slot and EDGE-1slot. RMC 12.2Kbps Mode for WCDMA band 5&4&2, only these modes were used for all tests. 2: 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. For the LTE band, we also evaluate the each channel of bandwidth, RB offset and modulation, we will choose the worst case shown on this report.

### 1.3. Tested System Details

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

Product	Manufacturer	Model No.	Serial No.	Power Cord
1 DC Power Supply	IDRC	CD-035-020PR	977272	N/A
2 Radio Communication Tester	Anritsu	MT8820C	6201181503	N/A
3 Radio Communication Tester	R&S	CMU 200	106388	N/A

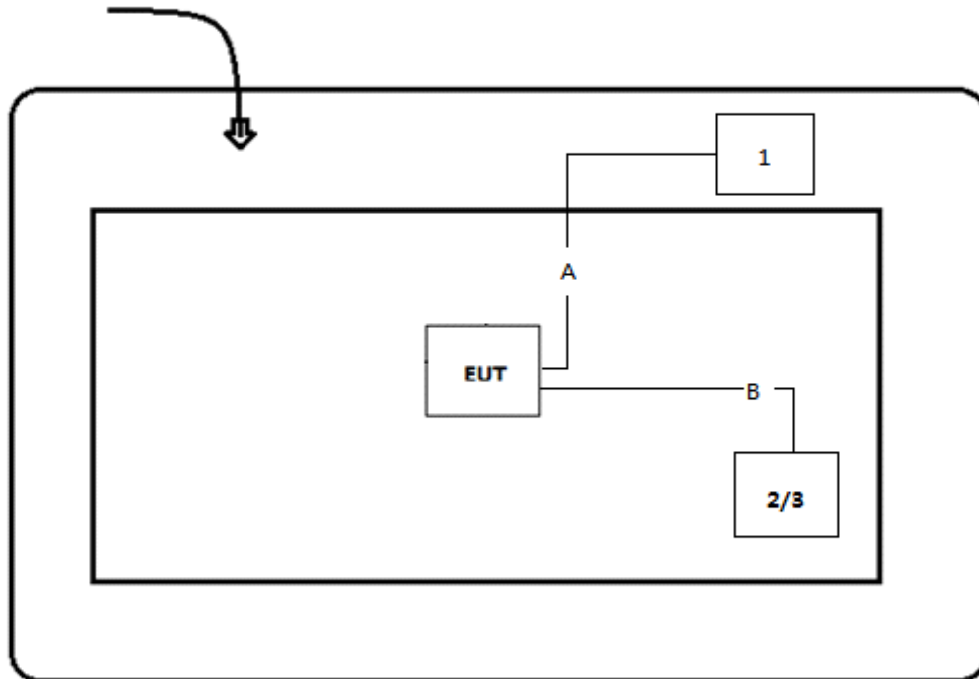
### 1.4. Configuration of Tested System





Conducted Connection Diagram

Chamber



Signal Cable Type	Signal cable Description	
A	Control Cable	Non-Shielded,2m
B	Coaxial Cable	Shielded,>5m

**1.5. EUT Exercise Software**

1	Setup the EUT and simulators as shown on above.
2	Turn on the power of all equipment.
3	EUT Communicate with MT8820C/CMU200, then select channel to test.

## 2. Summary Technical Test

### 2.1. Limit and Test Result

PCS 1900/WCDMA Band 2/LTE Band 2					
FCC Part 24 Subpart E/RSS					
Industry Canada RSS-133, Issue 6, Industry Canada RSS-GEN					
Test Item	FCC Reference section	FCC Limit	IC Reference section	IC Limit	Result
Maximum Output Power	§2.1033	< 2 Watts	§6.4	< 2 Watts	Pass
	§2.1046				
	§24.232				
Spurious Radiation	§2.1053	<-13dBm	§6.5	<-13dBm	Pass
	§24.238				

WCDMA Band 4/LTE Band 4					
FCC Part 27 Subpart L					
Industry Canada RSS-139, Issue 3 , Industry Canada RSS-GEN					
Test Item	FCC Reference section	FCC Limit	IC Reference section	IC Limit	Result
Maximum Output Power	§2.1033	<1 Watts	§6.5	<1 Watts	Pass
	§2.1046				
	§27.50				
Spurious Radiation	§2.1053	<-13dBm	§6.6	<-13dBm	Pass
	§27.53				

GSM 850/WCDMA Band 5/LTE Band 5					
FCC Part 22 Subpart H					
Industry Canada RSS-132, Issue 3, Industry Canada RSS-GEN					
Test Item	FCC Reference section	FCC Limit	IC Reference section	IC Limit	Result
Maximum Output Power	§2.1033	<7 Watts	§5.4	<7 Watts	Pass
	§2.1046				
	§22.913				
Spurious Radiation	§2.1053	<-13dBm	§5.5	<-13dBm	Pass
	§§22.917				

LTE Band 12					
FCC Part 27 Subpart F					
Industry Canada RSS-130,Issue 1,Industry Canada RSS-GEN					
Test Item	FCC Reference section	FCC Limit	IC Reference section	IC Limit	Result
Maximum Output Power	§2.1033	<3 Watts	§4.4	<5 Watts	Pass
	§2.1046				
	§27.50				
Spurious Radiation	§2.1053	<-13dBm	§4.6	<-13dBm	Pass
	§27.53				

LTE Band 13					
FCC Part 27 Subpart F					
Industry Canada RSS-130,Issue 1,Industry Canada RSS-GEN					
Test Item	FCC Reference section	FCC Limit	IC Reference section	IC Limit	Result
Maximum Output Power	§2.1033	<3 Watts	§4.4	<5 Watts	Pass
	§2.1046				
	§27.50				
Equivalent Isotropic Radiated Power	§27.50	<3 Watts	§4.4	<5 Watts	Pass
Occupied Bandwidth	§2.1049	N/A	RSS-GEN	N/A	Pass
Conducted Band EdgeEmissions	§27.53	<-13dBm	§4.6	<-13dBm	Pass
Spurious Radiation	§2.1053 §27.53	<-13dBm	§4.6	<-13dBm	Pass
Frequency Stability Under Temperature & Voltage Variations	§2.1055 §27.54	< 2.5 ppm	§4.3	within the frequency range	Pass

LTE Band 17					
FCC Part 27 Subpart F					
Industry Canada RSS-130, Issue 1, Industry Canada RSS-GEN					
Test Item	FCC Reference section	FCC Limit	IC Reference section	IC Limit	Result
Maximum Output Power	§2.1033 §2.1046 §27.50	<3 Watts	§4.4	<5 Watts	Pass
Spurious Radiation	§2.1053 §27.53	<-13dBm	§4.6	<-13dBm	Pass

## 2.2. Worst Data

### For GSM/GPRS/EDGE

Test Item	GSM Band	Channel	Frequency	Value(dBm)
Maximum Output Power	850	251	848.8	33.03
	1900	512	1850.2	30.11

Test Item	WCDMA Band	Channel	Frequency	Value(dBm)
Spurious Radiation(Conducted)	850	128	824.2	-33.902
	1900	810	1909.8	-41.867

### For WCDMA/HSDPA/HSUPA

Test Item	WCDMA Band	Channel	Frequency	Value(dBm)
Maximum Output Power	2	9400	1880	23.96
	4	1312	1712.4	23.83
	5	4182	836.4	23.81

Test Item	WCDMA Band	Channel	Frequency	Value(dBm)
Spurious Radiation(Conducted)	2	9538	1907.6	-54.368
	4	1862	1752.5	-55.790
	5	4182	836.4	-59.220

**For LTE**

Test Item	LTE Band	Bandwidth	Channel	Frequency	RB Size	RB Offset	Value
Maximum Output Power	2	20M	18700	1860	1	49	23.32
		15M	19125	1902.5	1	0	23.21
		10M	19150	1905	1	0	23.34
		5M	19175	1907.5	1	24	23.19
		3M	18615	1851.5	1	7	23.57
		1.4M	18607	1850.7	3	0	23.44
	4	20M	20050	1720	1	99	23.73
		15M	20175	1732.5	1	37	23.50
		10M	20175	1732.5	1	0	23.80
		5M	20175	1732.5	1	12	23.68
		3M	20175	1732.5	1	0	23.97
		1.4M	19957	1710.7	1	5	23.30
	5	10M	20600	844	1	24	23.85
		5M	20425	826.5	1	0	23.79
		3M	20415	825.5	1	0	24.08
		1.4M	20525	836.5	1	0	23.91
	12	10M	23095	707.5	1	0	23.56
		5M	23035	701.5	1	0	23.53
		3M	23025	700.5	1	7	23.49
		1.4M	23095	707.5	1	2	23.56
	13	10M	23230	782	1	0	23.39
		5M	23205	779.5	1	12	23.46
	17	10M	23800	711	1	0	23.57
		5M	23790	710	1	0	23.38

Note: The modulation of the worst data is QPSK

Test Item	LTE Band	Bandwidth	Channel	Frequency	RB Size	RB Offset	Value
Equivalent Isotropic Radiated Power	13	10M	23230	782	1	0	23.39
		5M	23230	779.5	1	12	23.46

Note: The modulation of the worst data is QPSK

Test Item	LTE Band	Bandwidth	Channel	Frequency	RB Size	RB Offset	Value
Occupied Bandwidth	13	10M	23230	782	50	0	9662
		5M	23230	782	50	0	5021

Note: The modulation of the worst data is QPSK

Test Item	LTE Band	Bandwidth	Channel	Frequency	RB Size	RB Offset	Value
Conducted Band Edge Emissions	13	5M	23205	779.5	1	0	-40.280

Note: The modulation of the worst data is QPSK

Test Item	LTE Band	Bandwidth	Channel	Frequency	RB Size	RB Offset	Value
Field Strength of Spurious Radiation	2	3M	18615	1851.5	1	0	
	4	5M	19975	1712.5	1	0	
	5	5M	19975	1712.5	1	0	
	12	10M	23095	707.5	1	0	
	13	5M	23230	772	1	0	
	17	10M	23800	711	1	0	

Note: The modulation of the worst data is QPSK

Test Item	LTE Band	Bandwidth	Channel	Frequency	RB Size	RB Offset	Value
Frequency Stability Under Temperature & Voltage Variations	13	10M	23230	782	1	0	1067

Note: The modulation of the worst data is QPSK

### 2.3. Test Environment

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	23
Humidity (%RH)	25-75	52
Barometric pressure (mbar)	860-1060	950-1000

### 2.4. Measurement Uncertainty

Items	Uncertainty
Maximum Output Power	±1.2 dB
Equivalent Isotropic Radiated Power	±3.2 dB
Occupied Bandwidth	±10 Hz
Conducted Band Edge Emissions	±1.2 dB
Field Strength of Spurious Radiation	±3.2 dB
Frequency Stability Under Temperature & Voltage Variations	±10 Hz



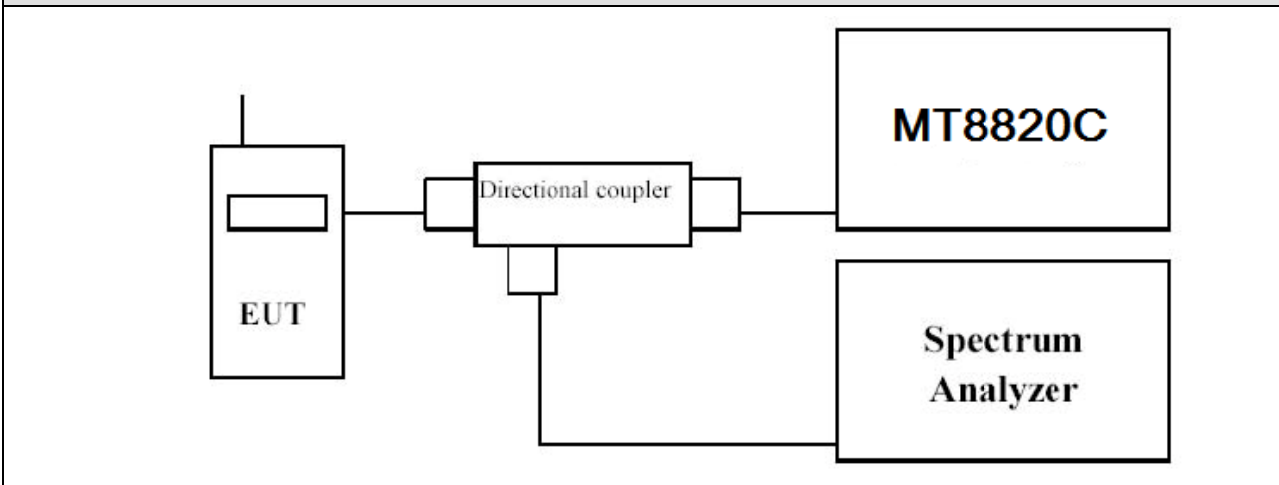
### 3. Maximum Output Power and Effective Isotropic Radiated Power Measurement

#### 3.1. Test Equipment

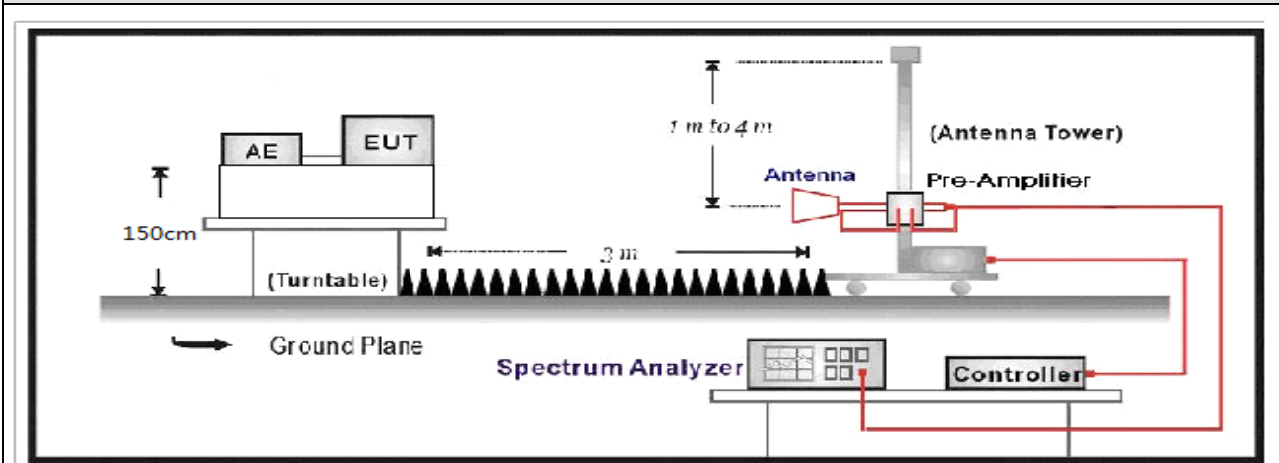
Maximum Output Power and Effective Isotropic Radiated Power Measurement / AC-5				
Instrument	Manufacturer	Type No.	Serial No	Cali. Due Date
PSA Series Spectrum Analyzer	Agilent	E4440A	MY49420184	2018.02.04
Radio Communication Tester	Anritsu	MT8820C	6201181503	2018.09.16
Dual Directional Coupler	Agilent	778D	20160	2018.02.04
10dB Coaxial Coupler	Agilent	87300C	MY44300299	2018.03.28
PSG Analog Signal Generator	Agilent	E8257D	MY44321116	2018.02.04
Preamplifier	QuieTek	AP-025C	CHM-0503006	2018.04.11
Preamplifier	Miteq	NSP1800-25	1364185	2018.05.03
Bilog Antenna	Teseq GmbH	CBL6112D	27612	2018.01.23
Half Wave Tuned Dipole Antenna	COM-POWER	AD-100	40137	2018.02.26
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	737	2018.03.06
DRG Horn	ETS-Lindgren	3117	00167055	2018.07.23
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC5-TH	2018.01.05

### 3.2. Test Setup

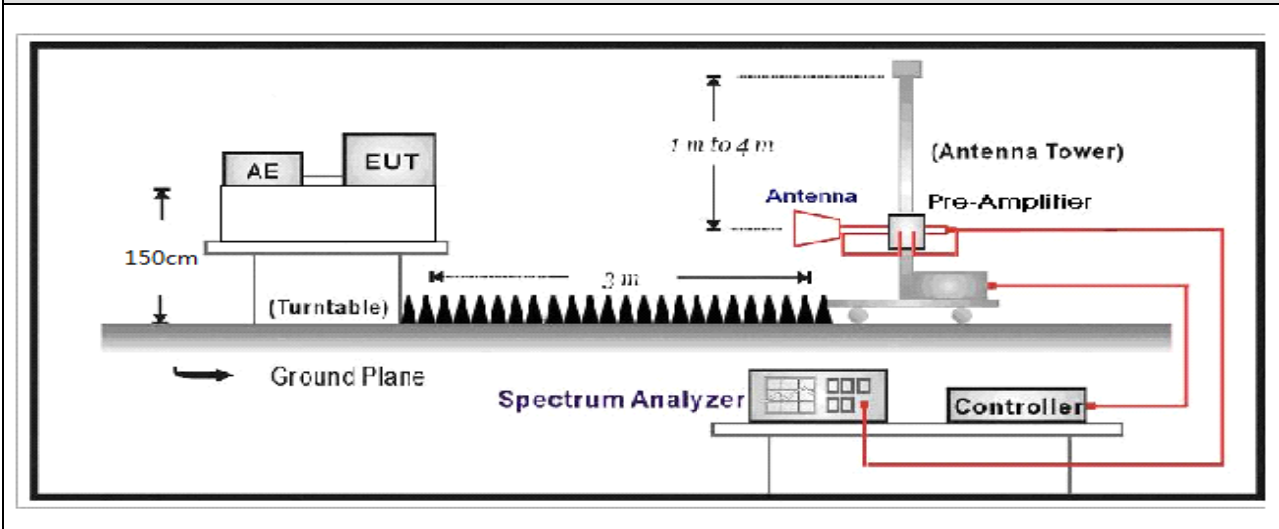
**Conducted Power Measurement:**



**Radiated Power Measurement (Below 1G):**



**Radiated Power Measurement (Above 1G):**



### 3.3. Test Procedure

#### Test Method for conducted power

- a) The RF output of the transmitter was connected to base station simulator.
- b) The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.  
The path loss was compensated to the results for each measurement.
- c) Set EUT at maximum average power by base station simulator.
- d) Measure lowest, middle, and highest channels for each bandwidth and different modulation.

#### Test For Effective Isotropic Radiated Power Measurement:

- a) The EUT was placed on a turntable with 1.5 meter height in a fully anechoic chamber.
- b) The EUT was set at 3 meters from the receiving antenna, which was mounted on the antenna tower
- c) LTE operating modes: use channel power function to test
- d) The table was rotated 360 degrees to determine the position of the highest radiated power.
- e) The height of the receiving antenna is adjusted to look for the maximum EIRP.
- f) The maximum EIRP shall be record.
- g) A dipole antenna was substituted in place of the EUT and was driven by a signal generator.
- h) The conducted power at the terminal of the dipole antenna is measured.
- i) Repeat step c) to step h) to get the maximum EIRP of the substitution antenna.
- j)  $EIRP = P_s + E_t - E_s + G_s = P_s + R_t - R_s + G_s$ .
- k)  $P_s$  (dBm) : Input power to substitution antenna
- l)  $G_s$  (dBi or dBd) : Substitution antenna Gain.
- m)  $E_t = R_t + AF$
- n)  $E_s = R_s + AF$
- o)  $AF$  (dB/m) : Receive antenna factor
- p)  $R_t$  : The highest received signal in spectrum analyzer for EUT.
- q)  $R_s$  : The highest received signal in spectrum analyzer for substitution antenna.

### 3.4. Test Result

Product	Module		
Test Item	Maximum Output Power		
Test Mode	Mode 1: GSM 850 Link		
Date of Test	2017/11/26	Test Site	TR-8

Mode	Modulation	Maximum Average Power [dBm]		
		Low Ch. / Freq.	Mid Ch. / Freq.	High Ch. / Freq.
Channel		128	189	251
Frequency		824.2	836.4	848.8
GPRS 850	GMSK	32.78	32.89	33.03
EDGE 850	8PSK	27.54	27.34	27.26

Product	Module		
Test Item	Maximum Output Power		
Test Mode	Mode 2: PCS 1900 Link		
Date of Test	2017/11/26	Test Site	TR-8

Mode	Modulation	Maximum Average Power [dBm]		
		Low Ch. / Freq.	Mid Ch. / Freq.	High Ch. / Freq.
Channel		512	661	810
Frequency		1850.2	1880.0	1909.8
GPRS 1900	GMSK	30.11	29.86	29.78
EDGE1900	8PSK	25.74	25.23	25.36

Product	Module		
Test Item	Maximum Output Power		
Test Mode	Mode 3: WCDMA Band 2 Link		
Date of Test	2017/11/26	Test Site	TR-8

Mode	3GPP Subset	Mod	Maximum Average Power [dBm]		
			Low Ch. / Freq.	Mid Ch. / Freq.	High Ch. / Freq.
Channel			9262	9400	9538
Frequency			1852.4	1880	1907.6
WCDMA R99	1	QPSK	23.37	23.96	23.31
Rel5 HSDPA	1		23.10	23.51	23.09
	2		23.05	23.43	23.01
	3		23.04	23.41	22.97
	4		23.03	23.39	22.96
Rel6 HSUPA	1		23.07	23.41	23.12
	2		21.11	21.39	21.19
	3		22.08	22.43	21.14
	4		21.07	21.36	21.17
	5		23.09	23.33	23.08

Product	Module		
Test Item	Maximum Output Power		
Test Mode	Mode 4: WCDMA Band 4 Link		
Date of Test	2017/11/26	Test Site	TR-8

Mode	3GPP Subset	Mod	Maximum Average Power [dBm]		
			Low Ch. / Freq.	Mid Ch. / Freq.	High Ch. / Freq.
Channel			1312	1413	1513
Frequency			1712.4	1732.6	1752.6
WCDMA R99	1	QPSK	23.83	23.77	23.57
Rel5 HSDPA	1		23.76	23.71	23.49
	2		23.74	23.63	23.41
	3		23.21	23.19	22.91
	4		23.19	23.18	22.89
Rel6 HSUPA	1		23.40	23.59	23.61
	2		21.41	21.58	21.61
	3		22.43	22.49	22.21
	4		21.39	21.55	21.57
	5		23.39	23.55	23.57

Product	Module		
Test Item	Maximum Output Power		
Test Mode	Mode 5: WCDMA Band 5 Link		
Date of Test	2017/11/26	Test Site	TR-8

Mode	3GPP Subset	Mod	Maximum Average Power [dBm]		
			Low Ch. / Freq.	Mid Ch. / Freq.	High Ch. / Freq.
Channel			4132	4182	4233
Frequency			826.4	836.4	846.6
WCDMA R99	1	QPSK	23.73	23.81	23.72
Rel5 HSDPA	1		23.69	23.77	23.66
	2		23.67	23.75	23.65
	3		23.11	23.15	23.14
	4		23.05	23.11	23.07
Rel6 HSUPA	1		23.69	23.71	23.72
	2		21.57	21.69	21.66
	3		22.61	22.65	22.63
	4		21.55	21.68	21.63
	5		23.59	23.65	23.69

Product	Module	Test Site	AC-5
Test Item	Maximum Output Power	Date of Test	2017/11/27
Test Mode	Mode 6: LTE Band 2 Link	Test engineer	Damon

BW [MHz]	RB Size	RB Offset	Mod	Maximum Average Power[dBm]		
				Low Ch. / Freq.	Mid Ch. / Freq.	High Ch. / Freq.
<b>Channel</b>				<b>18700</b>	<b>18900</b>	<b>19100</b>
<b>Frequency</b>				<b>1860</b>	<b>1880</b>	<b>1900</b>
20	1	0	QPSK	22.89	23.18	23.32
20	1	49		23.32	22.99	23.15
20	1	99		22.84	22.91	23.11
20	50	0		22.18	21.84	21.98
20	50	24		22.08	22.07	22.27
20	50	49		21.93	22.05	22.21
20	100	0		22.13	21.92	22.15
20	1	0	16-QAM	22.53	23.16	23.15
20	1	49		23.11	22.76	22.80
20	1	99		22.82	22.86	22.92
20	50	0		22.03	21.52	21.87
20	50	24		21.82	22.04	21.84
20	50	49		21.93	22.00	22.01
20	100	0		22.04	21.89	21.73
<b>Channel</b>				<b>18675</b>	<b>18900</b>	<b>19125</b>
<b>Frequency</b>				<b>1857.5</b>	<b>1880</b>	<b>1902.5</b>
15	1	0	QPSK	22.97	22.89	23.21
15	1	37		23.01	22.97	22.95
15	1	74		22.92	22.98	22.92
15	36	0		22.23	21.94	22.05
15	36	18		22.11	22.05	22.04
15	36	37		21.96	22.08	22.01
15	75	0		22.19	21.89	22.08
15	1	0	16-QAM	22.60	22.79	23.11
15	1	37		22.98	22.52	22.51
15	1	74		22.62	22.85	22.79
15	36	0		22.04	21.48	21.56
15	36	18		21.90	21.71	21.79



15	36	37		21.90	21.78	21.62
15	75	0		22.01	21.81	21.69
<b>Channel</b>				<b>18650</b>	<b>18900</b>	<b>19150</b>
<b>Frequency</b>				<b>1855</b>	<b>1880</b>	<b>1905</b>
10	1	0	QPSK	23.07	22.93	23.34
10	1	24		23.19	23.25	23.26
10	1	49		22.91	23.17	23.04
10	25	0		22.21	22.07	22.28
10	25	12		22.18	21.98	22.19
10	25	24		22.25	21.93	21.96
10	50	0		22.14	22.08	22.11
10	1	0	16-QAM	22.88	22.70	22.98
10	1	24		22.86	23.14	23.12
10	1	49		22.78	22.83	22.76
10	25	0		22.09	21.98	21.83
10	25	12		21.89	21.87	21.69
10	25	24		22.19	21.60	21.67
10	50	0		22.02	22.05	21.90
<b>Channel</b>				<b>18625</b>	<b>18900</b>	<b>19175</b>
<b>Frequency</b>				<b>1852.5</b>	<b>1880</b>	<b>1907.5</b>
5	1	0	QPSK	23.18	22.88	22.93
5	1	12		23.01	22.91	23.11
5	1	24		23.12	22.79	23.19
5	12	0		22.17	21.98	22.07
5	12	6		22.23	22.04	21.95
5	12	11		22.19	22.11	21.99
5	25	0		22.13	22.01	22.08
5	1	0	16-QAM	23.05	22.69	22.69
5	1	12		22.75	22.53	22.86
5	1	24		22.78	22.70	23.04
5	12	0		22.05	21.65	21.99
5	12	6		21.77	21.98	21.79
5	12	11		21.76	21.99	21.92
5	25	0		21.78	21.71	21.80
<b>Channel</b>				<b>18615</b>	<b>18900</b>	<b>19185</b>
<b>Frequency</b>				<b>1851.5</b>	<b>1880</b>	<b>1908.5</b>
3	1	0	QPSK	23.37	23.53	23.38

3	1	7		23.57	22.98	22.96
3	1	14		23.33	23.10	23.09
3	8	0		22.51	21.73	22.22
3	8	4		22.14	22.20	21.89
3	8	7		21.99	21.65	22.27
3	15	0		22.21	22.25	21.73
3	1	0		16-QAM	23.30	23.04
3	1	7	23.27		22.80	22.77
3	1	14	23.22		22.93	22.97
3	8	0	22.11		21.70	21.81
3	8	4	22.12		22.08	21.47
3	8	7	21.77		21.60	21.84
3	15	0	22.12		21.97	21.67
<b>Channel</b>				<b>18607</b>	<b>18900</b>	<b>19193</b>
<b>Frequency</b>				<b>1850.7</b>	<b>1880</b>	<b>1909.3</b>
1.4	1	0	QPSK	23.06	23.03	22.95
1.4	1	2		23.02	22.87	22.53
1.4	1	5		23.33	23.08	22.91
1.4	3	0		23.44	22.95	22.76
1.4	3	1		23.07	22.73	23.21
1.4	3	2		23.19	23.23	22.42
1.4	6	0		22.19	21.95	21.74
1.4	1	0	16-QAM	22.82	22.53	22.90
1.4	1	2		23.01	22.74	22.50
1.4	1	5		22.89	22.73	22.43
1.4	3	0		23.04	22.77	22.38
1.4	3	1		22.67	22.54	22.84
1.4	3	2		22.90	22.79	22.33
1.4	6	0		21.93	21.91	21.52

Product	Module	Test Site	AC-5
Test Item	Maximum Output Power	Date of Test	2017/11/27
Test Mode	Mode 7: LTE Band 4 Link	Test engineer	Damon

BW [MHz]	RB Size	RB Offset	Mod	Maximum Average Power[dBm]		
				Low Ch. / Freq.	Mid Ch. / Freq.	High Ch. / Freq.
<b>Channel</b>				<b>20050</b>	<b>20175</b>	<b>20300</b>
<b>Frequency</b>				<b>1720</b>	<b>1732.5</b>	<b>1745</b>
20	1	0	QPSK	23.08	23.38	23.19
20	1	49		23.30	23.67	23.38
20	1	99		23.73	22.81	22.69
20	50	0		21.85	22.27	21.74
20	50	24		22.03	22.24	22.39
20	50	49		22.19	22.10	21.57
20	100	0		22.52	22.49	21.50
20	1	0	16-QAM	22.74	22.89	22.81
20	1	49		23.11	23.27	22.95
20	1	99		23.24	22.64	22.55
20	50	0		21.59	21.87	21.65
20	50	24		21.86	22.06	21.93
20	50	49		22.09	21.88	21.48
20	100	0		22.04	22.04	21.39
<b>Channel</b>				<b>20025</b>	<b>20175</b>	<b>20325</b>
<b>Frequency</b>				<b>1717.5</b>	<b>1732.5</b>	<b>1747.5</b>
15	1	0	QPSK	23.12	23.16	22.69
15	1	37		23.19	23.50	22.85
15	1	74		23.01	22.75	23.08
15	36	0		22.23	22.47	21.96
15	36	18		22.13	22.64	21.87
15	36	37		22.57	22.37	21.62
15	75	0		22.63	22.20	21.88
15	1	0	16-QAM	22.66	22.97	22.62
15	1	37		23.18	23.32	22.75
15	1	74		22.97	22.71	22.71
15	36	0		21.83	22.34	21.65
15	36	18		21.85	22.36	21.48

15	36	37		22.11	22.12	21.59
15	75	0		22.13	21.76	21.68
<b>Channel</b>				<b>20000</b>	<b>20175</b>	<b>20350</b>
<b>Frequency</b>				<b>1715</b>	<b>1732.5</b>	<b>1750</b>
10	1	0	QPSK	23.49	23.62	23.34
10	1	24		23.31	23.61	23.15
10	1	49		23.63	23.56	23.41
10	25	0		22.24	22.36	22.06
10	25	12		22.18	22.31	22.03
10	25	24		22.28	22.28	22.09
10	50	0		22.21	22.31	22.08
10	1	0	16-QAM	23.57	23.82	23.44
10	1	24		23.38	23.50	23.13
10	1	49		23.34	23.59	23.46
10	25	0		22.38	22.27	22.11
10	25	12		22.41	22.24	22.05
10	25	24		22.32	22.13	22.40
10	50	0		22.59	22.03	21.90
<b>Channel</b>				<b>19975</b>	<b>20175</b>	<b>20375</b>
<b>Frequency</b>				<b>1712.5</b>	<b>1732.5</b>	<b>1752.5</b>
5	1	0	QPSK	23.63	23.32	23.53
5	1	12		23.07	23.68	23.42
5	1	24		23.16	23.47	22.98
5	12	0		22.30	22.31	22.08
5	12	6		22.34	22.19	22.02
5	12	11		22.08	22.61	22.05
5	25	0		21.97	22.11	22.00
5	1	0	16-QAM	23.29	23.25	23.17
5	1	12		22.97	23.22	23.09
5	1	24		22.97	23.01	22.83
5	12	0		22.01	22.17	22.02
5	12	6		22.15	21.93	22
5	12	11		21.98	22.2	21.96
5	25	0		21.75	22.01	21.56
<b>Channel</b>				<b>19965</b>	<b>20175</b>	<b>20385</b>
<b>Frequency</b>				<b>1711.5</b>	<b>1732.5</b>	<b>1753.5</b>
3	1	0	QPSK	23.42	23.97	23.53

3	1	7		23.43	23.28	23.57
3	1	14		22.90	23.54	23.09
3	8	0		22.05	22.67	22.26
3	8	4		21.99	22.00	22.06
3	8	7		22.14	22.39	21.92
3	15	0		22.33	22.28	21.94
3	1	0		16-QAM	23.33	23.52
3	1	7	23.18		23.15	23.13
3	1	14	22.82		23.42	23.01
3	8	0	21.95		22.21	21.92
3	8	4	21.86		21.97	21.74
3	8	7	22.12		21.90	21.77
3	15	0	22.03		22.06	21.65
<b>Channel</b>				<b>19957</b>	<b>20175</b>	<b>20393</b>
<b>Frequency</b>				<b>1710.7</b>	<b>1732.5</b>	<b>1754.3</b>
1.4	1	0	QPSK	22.98	23.16	23.20
1.4	1	2		23.01	23.28	23.09
1.4	1	5		23.30	23.29	23.06
1.4	3	0		22.95	22.96	23.35
1.4	3	1		22.86	22.68	23.06
1.4	3	2		22.95	22.68	22.77
1.4	6	0		22.37	22.01	22.30
1.4	1	0	16-QAM	22.97	23.05	22.89
1.4	1	2		22.93	23.00	22.86
1.4	1	5		22.88	22.86	22.79
1.4	3	0		22.62	22.57	22.85
1.4	3	1		22.65	22.67	22.75
1.4	3	2		22.71	22.67	22.72
1.4	6	0		21.96	21.87	22.00

Product	Module	Test Site	AC-5
Test Item	Maximum Output Power	Date of Test	2017/11/27
Test Mode	Mode 8: LTE Band 5 Link	Test engineer	Damon

BW [MHz]	RB Size	RB Offset	Mod	Maximum Average Power[dBm]		
				Low Ch. / Freq.	Mid Ch. / Freq.	High Ch. / Freq.
<b>Channel</b>				<b>20450</b>	<b>20525</b>	<b>20600</b>
<b>Frequency</b>				<b>829</b>	<b>836.5</b>	<b>844</b>
10	1	0	QPSK	23.78	23.58	23.57
10	1	24		23.76	23.53	23.85
10	1	49		23.37	23.90	23.29
10	25	0		22.51	22.50	22.37
10	25	12		23.00	22.47	22.44
10	25	24		22.59	22.59	22.58
10	50	0		22.40	22.52	22.50
10	1	0	16-QAM	23.72	23.56	23.32
10	1	24		23.64	23.20	23.53
10	1	49		23.04	23.41	23.27
10	25	0		22.31	22.09	22.33
10	25	12		22.56	22.03	22.29
10	25	24		22.42	22.20	22.24
10	50	0		22.32	22.10	22.45
<b>Channel</b>				<b>20425</b>	<b>20525</b>	<b>20625</b>
<b>Frequency</b>				<b>826.5</b>	<b>836.5</b>	<b>846.5</b>
5	1	0	QPSK	23.79	23.27	23.49
5	1	12		23.70	23.62	23.30
5	1	24		23.78	23.29	23.65
5	12	0		22.59	22.37	22.40
5	12	6		22.54	22.49	22.13
5	12	11		22.99	22.46	22.69
5	25	0		22.74	22.59	22.14
5	1	0	16-QAM	23.77	23.23	23.37
5	1	12		23.51	23.54	23.04
5	1	24		23.70	23.28	23.34
5	12	0		22.38	22.12	22.10
5	12	6		22.41	22.16	22.06

5	12	11		22.52	22.27	22.23
5	25	0		22.38	22.37	22.07
<b>Channel</b>				<b>20415</b>	<b>20525</b>	<b>20635</b>
<b>Frequency</b>				<b>825.5</b>	<b>836.5</b>	<b>847.5</b>
3	1	0	QPSK	23.86	23.71	23.70
3	1	7		23.78	23.66	23.45
3	1	14		23.90	23.91	23.68
3	8	0		22.98	22.57	22.41
3	8	4		23.11	22.91	22.19
3	8	7		22.84	22.38	22.18
3	15	0		22.61	22.53	22.30
3	1	0	16-QAM	23.72	23.49	23.26
3	1	7		23.65	23.38	23.41
3	1	14		23.42	23.51	23.44
3	8	0		22.74	22.36	22.02
3	8	4		22.64	22.50	22.09
3	8	7		22.58	22.07	22.00
3	15	0		22.38	22.13	22.15
<b>Channel</b>				<b>20407</b>	<b>20525</b>	<b>20643</b>
<b>Frequency</b>				<b>824.7</b>	<b>836.5</b>	<b>848.3</b>
1.4	1	0	QPSK	23.53	23.91	23.31
1.4	1	2		23.48	23.82	23.50
1.4	1	5		23.63	23.71	23.57
1.4	3	0		23.44	23.87	23.63
1.4	3	1		23.73	23.45	23.65
1.4	3	2		23.66	23.76	23.66
1.4	6	0		22.62	22.83	22.13
1.4	1	0	16-QAM	23.49	23.42	22.88
1.4	1	2		23.19	23.32	23.05
1.4	1	5		23.42	23.39	23.13
1.4	3	0		23.18	23.43	23.38
1.4	3	1		23.55	23.32	23.17
1.4	3	2		23.56	23.35	23.40
1.4	6	0		22.53	22.49	21.87

Product	Module	Test Site	AC-5
Test Item	Maximum Output Power	Date of Test	2017/11/27
Test Mode	Mode 9: LTE Band 12 Link	Test engineer	Damon

BW [MHz]	RB Size	RB Offset	Mod	Maximum Average Power[dBm]		
				Low Ch. / Freq.	Mid Ch. / Freq.	High Ch. / Freq.
<b>Channel</b>				<b>23060</b>	<b>23095</b>	<b>23130</b>
<b>Frequency</b>				<b>704</b>	<b>707.5</b>	<b>711</b>
10	1	0	QPSK	23.43	23.56	23.37
10	1	24		23.18	23.37	23.15
10	1	49		23.16	23.23	23.15
10	25	0		22.98	23.11	23.31
10	25	12		23.03	22.90	23.17
10	25	24		22.82	22.98	23.42
10	50	0		23.32	23.05	23.10
10	1	0	16-QAM	22.52	22.58	22.38
10	1	24		22.77	22.25	22.62
10	1	49		22.28	22.30	22.52
10	25	0		22.36	22.19	22.45
10	25	12		22.00	22.03	22.03
10	25	24		22.01	22.32	22.10
10	50	0		22.66	23.40	21.19
<b>Channel</b>				<b>23035</b>	<b>23095</b>	<b>23155</b>
<b>Frequency</b>				<b>701.5</b>	<b>707.5</b>	<b>713.5</b>
5	1	0	QPSK	23.53	23.36	23.31
5	1	12		23.39	23.28	23.47
5	1	24		23.36	23.47	23.05
5	12	0		23.35	23.19	23.20
5	12	6		23.07	23.31	23.32
5	12	11		23.02	22.86	23.46
5	25	0		23.19	22.92	23.14
5	1	0	16-QAM	22.59	22.40	22.48
5	1	12		22.83	22.50	22.36
5	1	24		22.65	22.54	22.49
5	12	0		22.27	22.23	22.16
5	12	6		22.36	21.76	22.44



5	12	11		22.27	22.12	22.14
5	25	0		22.00	22.00	22.18
<b>Channel</b>				<b>23025</b>	<b>23095</b>	<b>23165</b>
<b>Frequency</b>				<b>700.5</b>	<b>707.5</b>	<b>714.5</b>
3	1	0	QPSK	23.40	23.48	23.49
3	1	7		23.49	23.20	23.20
3	1	14		23.36	22.98	22.86
3	8	0		23.23	22.79	23.20
3	8	4		22.84	22.87	23.24
3	8	7		22.94	22.97	23.12
3	15	0		23.30	23.18	23.14
3	1	0		16-QAM	22.85	22.64
3	1	7	22.40		22.62	22.49
3	1	14	22.42		22.22	22.47
3	8	0	22.33		21.79	22.06
3	8	4	22.21		22.16	22.26
3	8	7	22.65		22.20	22.47
3	15	0	22.09		22.35	22.09
<b>Channel</b>					<b>23017</b>	<b>23095</b>
<b>Frequency</b>				<b>699.7</b>	<b>707.5</b>	<b>715.3</b>
1.4	1	0	QPSK	23.30	23.42	23.52
1.4	1	2		23.45	23.56	23.50
1.4	1	5		23.11	23.11	23.32
1.4	3	0		23.26	22.85	23.25
1.4	3	1		23.26	23.22	23.01
1.4	3	2		22.72	22.66	22.64
1.4	6	0		22.63	22.66	22.53
1.4	1	0	16-QAM	22.80	22.69	22.60
1.4	1	2		22.43	22.58	22.46
1.4	1	5		22.66	22.21	22.39
1.4	3	0		22.37	22.23	22.12
1.4	3	1		22.02	22.27	21.90
1.4	3	2		21.85	21.79	22.03
1.4	6	0		21.94	21.87	21.62

Product	Module	Test Site	AC-5
Test Item	Maximum Output Power	Date of Test	2017/11/27
Test Mode	Mode 10: LTE Band 13 Link	Test engineer	Damon

BW [MHz]	RB Size	RB Offset	Mod	Maximum Average Power[dBm]		
				Low Ch. / Freq.	Mid Ch. / Freq.	High Ch. / Freq.
<b>Channel</b>				<b>23205</b>	<b>23230</b>	<b>23255</b>
<b>Frequency</b>				<b>779.5</b>	<b>782</b>	<b>784.5</b>
5	1	0	QPSK	23.20	23.41	23.41
5	1	12		23.46	23.40	23.37
5	1	24		23.07	23.08	23.26
5	12	0		22.93	22.91	23.03
5	12	6		23.08	22.95	22.68
5	12	11		22.63	22.72	22.60
5	25	0		22.76	22.68	22.67
5	1	0	16-QAM	22.49	22.64	22.61
5	1	12		22.21	22.22	22.19
5	1	24		22.23	22.08	22.04
5	12	0		22.28	21.96	22.12
5	12	6		21.94	21.67	21.60
5	12	11		21.93	21.70	21.56
5	25	0		21.69	21.57	21.52
<b>Channel</b>				<b>/</b>	<b>23230</b>	<b>/</b>
<b>Frequency</b>				<b>/</b>	<b>782</b>	<b>/</b>
10	1	0	QPSK	/	23.39	/
10	1	24		/	23.38	/
10	1	49		/	22.90	/
10	25	0		/	22.99	/
10	25	12		/	22.94	/
10	25	24		/	22.49	/
10	50	0		/	22.58	/
10	1	0	16-QAM	/	22.30	/
10	1	24		/	22.54	/
10	1	49		/	22.20	/
10	25	0		/	21.85	/
10	25	12		/	22.09	/

10	25	24		/	22.04	/
10	50	0		/	21.92	/

Product	Module	Test Site	AC-5
Test Item	Maximum Output Power	Date of Test	2017/11/27
Test Mode	Mode 11: LTE Band 17 Link	Test engineer	Damon

BW [MHz]	RB Size	RB Offset	Mod	Maximum Average Power[dBm]		
				Low Ch. / Freq.	Mid Ch. / Freq.	High Ch. / Freq.
<b>Channel</b>				<b>23780</b>	<b>23790</b>	<b>23800</b>
<b>Frequency</b>				<b>709</b>	<b>710</b>	<b>711</b>
10	1	0	QPSK	23.40	23.36	23.57
10	1	24		23.53	23.51	23.14
10	1	49		23.10	23.35	23.18
10	25	0		23.28	23.19	22.99
10	25	12		23.04	22.81	22.76
10	25	24		22.91	22.76	22.74
10	50	0		22.71	22.40	22.55
10	1	0	16-QAM	22.46	22.55	22.56
10	1	24		22.54	22.68	22.29
10	1	49		22.39	22.19	22.13
10	25	0		21.96	22.17	22.29
10	25	12		22.01	21.96	21.71
10	25	24		21.78	21.92	21.53
10	50	0		21.69	21.65	21.34
<b>Channel</b>				<b>23755</b>	<b>23790</b>	<b>23825</b>
<b>Frequency</b>				<b>706.5</b>	<b>710</b>	<b>713.5</b>
5	1	0	QPSK	23.25	23.38	23.09
5	1	12		23.36	23.04	22.94
5	1	24		23.21	22.92	22.84
5	12	0		22.92	22.99	22.68
5	12	6		22.99	22.86	22.59
5	12	11		22.60	22.45	22.61
5	25	0		22.39	22.54	22.49
5	1	0	16-QAM	22.85	22.60	22.34
5	1	12		22.46	22.49	22.24
5	1	24		22.40	22.37	22.48
5	12	0		22.34	21.92	22.21
5	12	6		22.09	21.73	21.77

5	12	11		21.75	21.97	21.54
5	25	0		21.42	21.33	21.24

Product	Module	Test Site	AC-5
Test Item	Effective Radiated Power	Date of Test	2017/11/27
Test Mode	Mode 10: LTE Band 13 Link	Test engineer	Damon

LTE Band 13 Radiated Power ERP							
LTE Band	Channel BW (MHz)	Modulation	RB Configuration		Channel	Freq. (MHz)	ERP (dBm)
			RB Size	RB Offset			
13	10	QPSK	1	0	Mid	782	24.11
13	10	16QAM	1	0	Mid	782	24.41
13	5	QPSK	1	12	Low	779.5	24.87
13	5	QPSK	1	12	Mid	782	24.92
13	5	QPSK	1	12	High	784.5	24.33
13	5	16QAM	1	12	Low	779.5	24.24
13	5	16QAM	1	12	Mid	782	25.44
13	5	16QAM	1	12	High	784.5	24.20

Product	Module		
Test Item	Effective Radiated Power		
Test Mode	Mode 7: LTE Band 17 Link		
Date of Test	2017/11/27	Test Site	AC-5

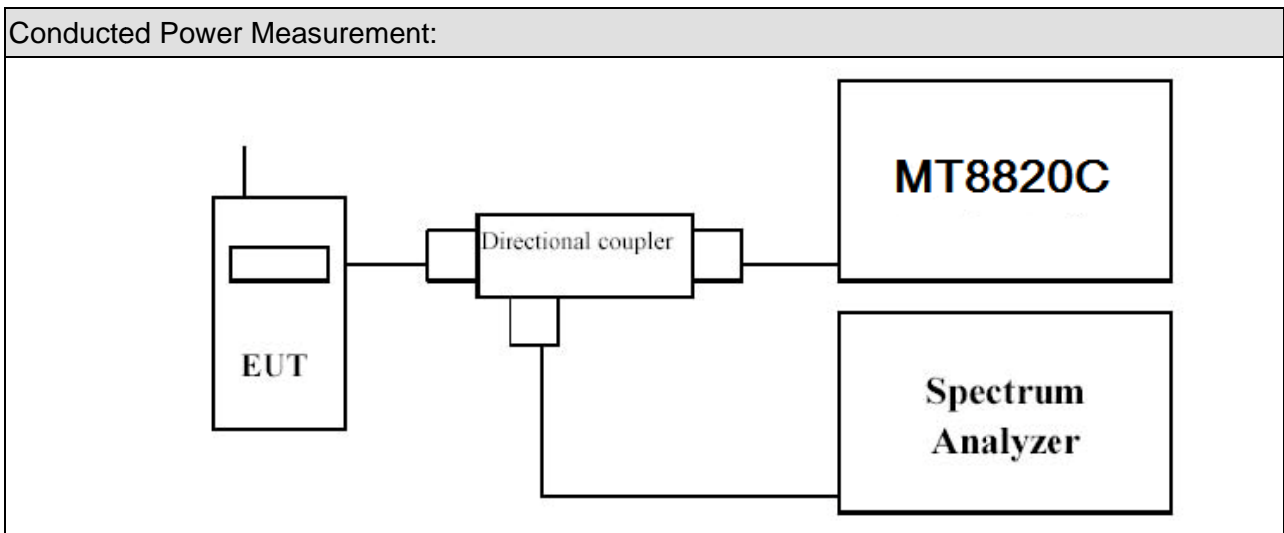
LTE Band 17 Radiated Power ERP							
LTE Band	Channel BW (MHz)	Modulation	RB Configuration		Channel	Freq. (MHz)	ERP (dBm)
			RB Size	RB Offset			
17	10	QPSK	1	0	Low	709	24.94
17	10	QPSK	1	0	Mid	710	24.63
17	10	QPSK	1	0	High	711	23.98
17	10	16QAM	1	0	Low	709	24.33
17	10	16QAM	1	0	Mid	710	24.57
17	10	16QAM	1	0	High	711	24.40
17	5	QPSK	1	0	Low	706.5	24.85
17	5	QPSK	1	0	Mid	710	24.37
17	5	QPSK	1	0	High	713.5	23.76
17	5	16QAM	1	0	Low	706.5	24.64
17	5	16QAM	1	0	Mid	710	24.78
17	5	16QAM	1	0	High	713.5	24.36

## 4. Occupied Bandwidth

### 4.1. Test Equipment

Occupied Bandwidth / TR-8				
Instrument	Manufacturer	Type No.	Serial No	Cali. Due Date
PSA Series Spectrum Analyzer	Agilent	E4440A	MY49420184	2018.02.04
Radio Communication Tester	Anritsu	MT8820C	6201181503	2018.09.16
Dual Directional Coupler	Agilent	778D	20160	2018.02.04
10dB Coaxial Coupler	Agilent	87300C	MY44300299	2018.03.28
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC6-TH	2018.01.05

### 4.2. Test Setup



### 4.3. Test Procedure

Test Method for conducted test
<ol style="list-style-type: none"> <li>1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.</li> <li>2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.</li> <li>3. The 99% occupied bandwidth and 26 dB bandwidth of the middle channel for the highest RF powers were measured.</li> </ol>

#### 4.4. Test Result

Product	Module	Test Site	TR-8
Test Item	Occupied Bandwidth	Date of Test	2017/11/29
Test Mode	Mode 10(QPSK)	Test engineer	Damon

Mode	Bandwidth (MHz)	Channel No.	Frequency (MHz)	99% Occupied Bandwidth (kHz)	-26dB Occupied Bandwidth (kHz)
LTE Band 13	10	23230	782	8924.9	9623
	5	23205	779.5	4512.1	4985
		23230	782	4492.9	5021
	23255	784.5	4514.5	4981	

Note1: The worst case as below:

LTE Band 13 BW10M Channel 23230 50RB0





Product	Module	Test Site	TR-8
Test Item	Occupied Bandwidth	Date of Test	2017/11/29
Test Mode	Mode 10(16QAM)	Test engineer	Damon

Mode	Bandwidth (MHz)	Channel No.	Frequency (MHz)	99% Occupied Bandwidth (kHz)	-26dB Occupied Bandwidth (kHz)
LTE Band 13	10	23230	782	8915.0	9662
	5	23205	779.5	4507.3	4950
		23230	782	4494.3	4975
		23255	784.5	4523.9	5016

Note1: The worst case as below:

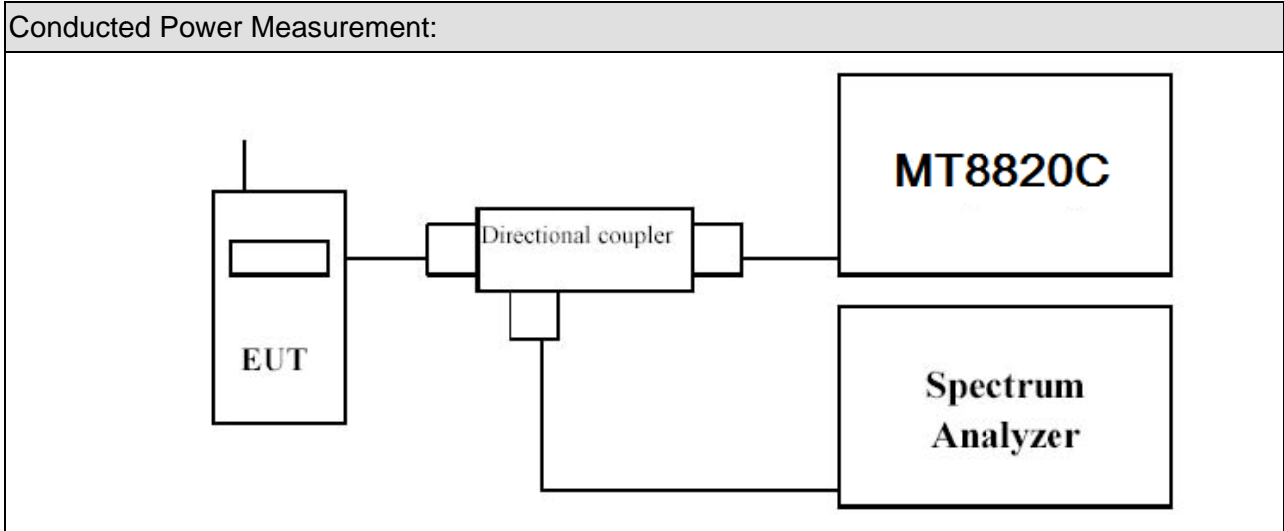
LTE Band 13 BW10M Channel 23230 50RB0



## 5. Conducted Band Edge

### 5.1. Test Equipment

Conducted Band Edge / TR-8				
Instrument	Manufacturer	Type No.	Serial No	Cali. Due Date
PSA Series Spectrum Analyzer	Agilent	E4440A	MY49420184	2018.02.04
Radio Communication Tester	Anritsu	MT8820C	6201181503	2018.09.16
Dual Directional Coupler	Agilent	778D	20160	2018.02.04
10dB Coaxial Coupler	Agilent	87300C	MY44300299	2018.03.28
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC6-TH	2018.01.05



### 5.2. Test Procedure

Test Method for conducted test
<ol style="list-style-type: none"> <li>1. The EUT was connected to spectrum analyzer and System Simulator via power divider.</li> <li>2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.</li> <li>3. The conducted spurious emission for the whole frequency range was taken.</li> </ol>

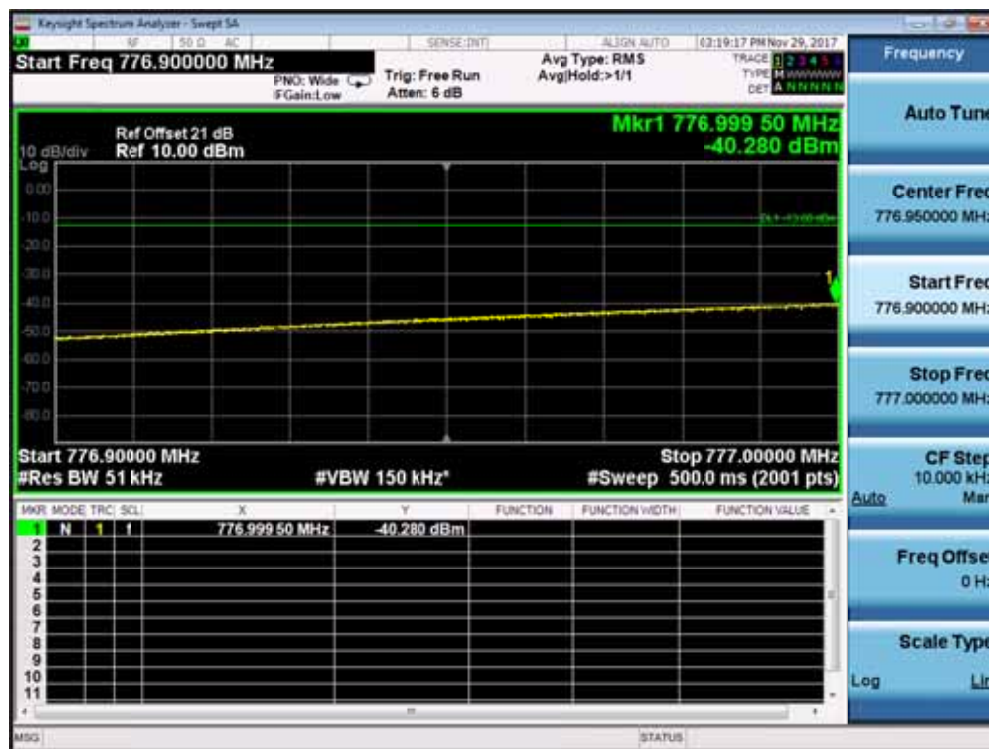
### 5.3. Test Result

Product	Module	Test Site	TR-8
Test Item	Conducted Band Edge	Date of Test	2017/11/29
Test Mode	Mode 10(QPSK)	Test engineer	Damon

Mode	Bandwidth (MHz)	Channel	Test Frequency (MHz)	RB	Measure Level (dBm)	Limit (dBm)	Result
RLTE Band 13	5	23205	779.5	1RB0	-40.280	< -13	Pass
				25RB0	-49.446	< -13	Pass
		23255	784.5	1RB24	-42.778	< -13	Pass
				25RB0	-46.537	< -13	Pass

Note: The worst case as below:

LTE Band 13 BW5M Channel 23205 1RB0

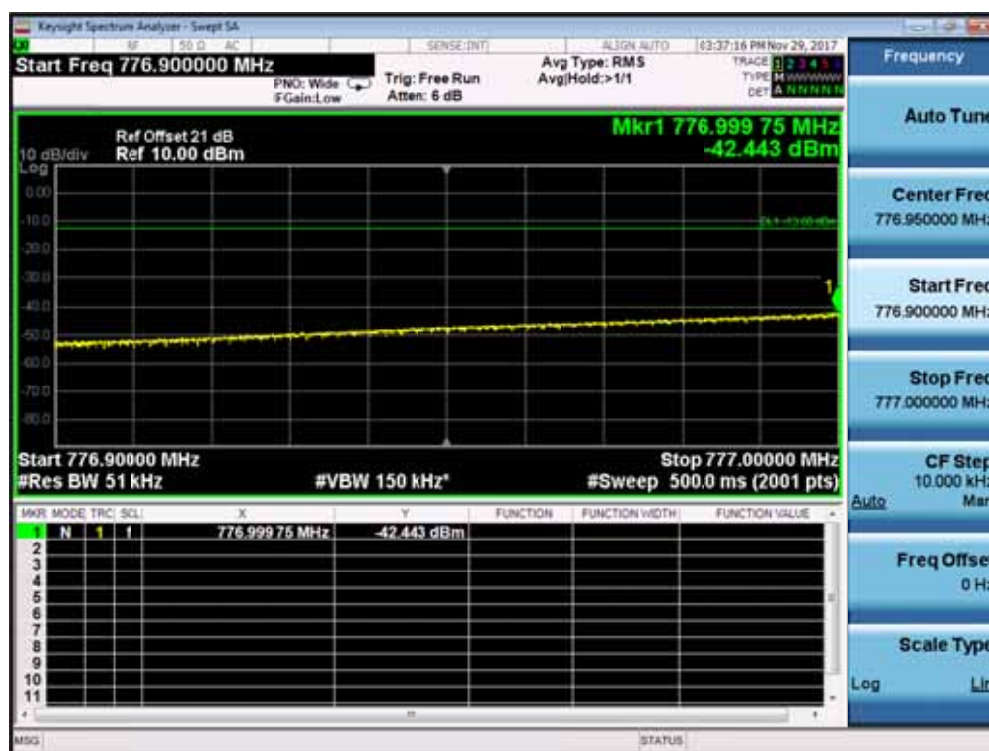


Product	Module	Test Site	TR-8
Test Item	Conducted Band Edge	Date of Test	2017/11/29
Test Mode	Mode 10(16QAM)	Test engineer	Damon

Mode	Bandwidth (MHz)	Channel	Test Frequency (MHz)	RB	Measure Level (dBm)	Limit (dBm)	Result
RLTE Band 13	5	23205	779.5	1RB0	-42.443	< -13	Pass
				25RB0	-50.288	< -13	Pass
		23255	784.5	1RB24	-42.654	< -13	Pass
				25RB0	-48.667	< -13	Pass

**Note: The worst case as below:**

**LTE Band 13 BW5M Channel 23255 1RB24**



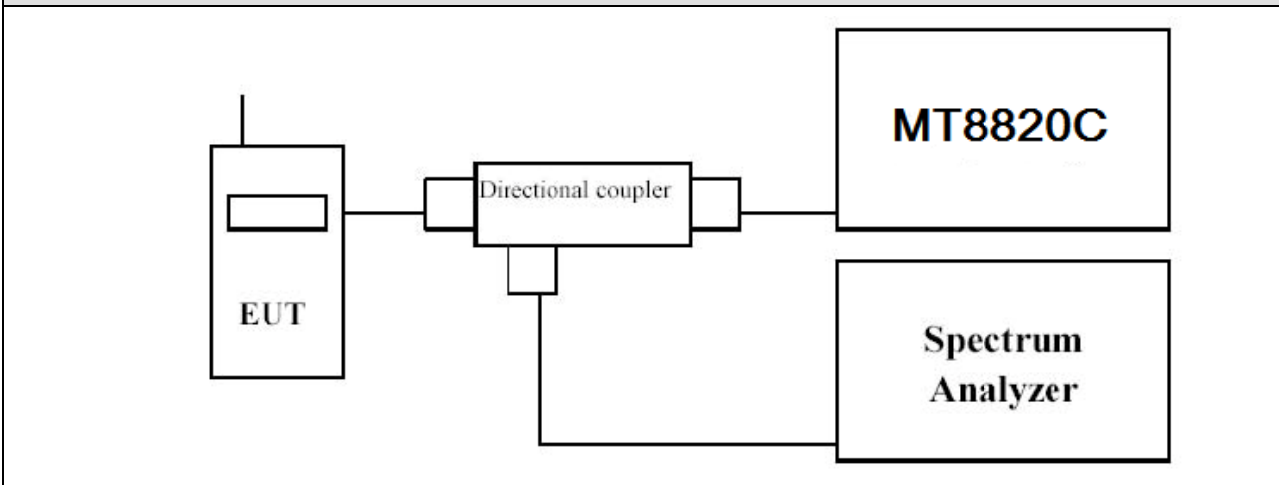
## 6. Spurious Emission

### 6.1. Test Equipment

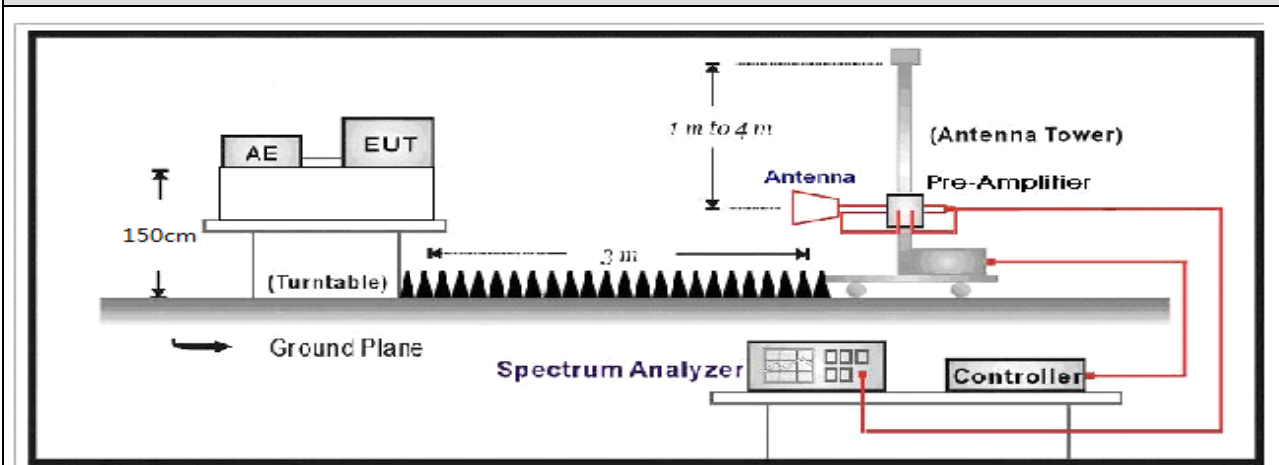
Spurious Emission / AC-5				
Instrument	Manufacturer	Type No.	Serial No	Cali. Due Date
PSA Series Spectrum Analyzer	Agilent	E4440A	MY49420184	2018.02.04
Radio Communication Tester	Anritsu	MT8820C	6201181503	2018.09.16
Dual Directional Coupler	Agilent	778D	20160	2018.02.04
10dB Coaxial Coupler	Agilent	87300C	MY44300299	2018.03.28
PSG Analog Signal Generator	Agilent	E8257D	MY44321116	2018.02.04
Preamplifier	QuieTek	AP-025C	CHM-0503006	2018.04.11
Preamplifier	Miteq	NSP1800-25	1364185	2018.05.03
Bilog Antenna	Teseq GmbH	CBL6112D	27612	2018.01.23
Half Wave Tuned Dipole Antenna	COM-POWER	AD-100	40137	2018.02.26
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	737	2018.03.06
DRG Horn	ETS-Lindgren	3117	00167055	2018.07.23
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC5-TH	2018.01.05

## 6.2. Test Setup

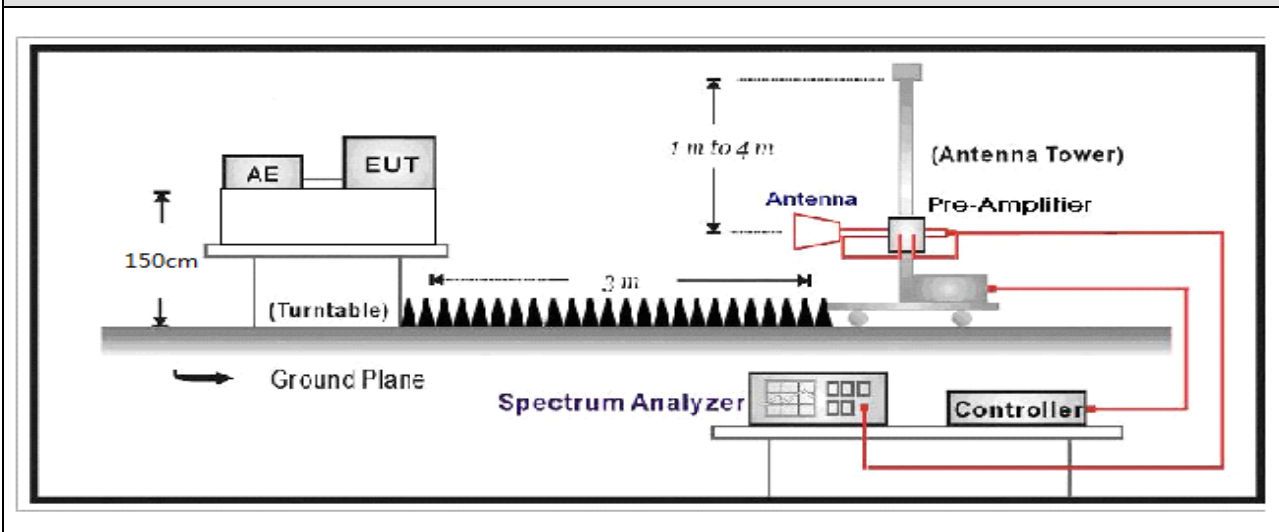
### Conducted Power Measurement:



### Radiated Power Measurement (Below 1G):



### Radiated Power Measurement (Above 1G):



### 6.3. Test Procedure

#### Test Method for conducted power

- a) The RF output of the transmitter was connected to base station simulator.
- b) The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.  
The path loss was compensated to the results for each measurement.
- c) Set EUT at maximum average power by base station simulator.
- d) Measure lowest, middle, and highest channels for each bandwidth and different modulation.

#### Test For Effective Isotropic Radiated Power Measurement:

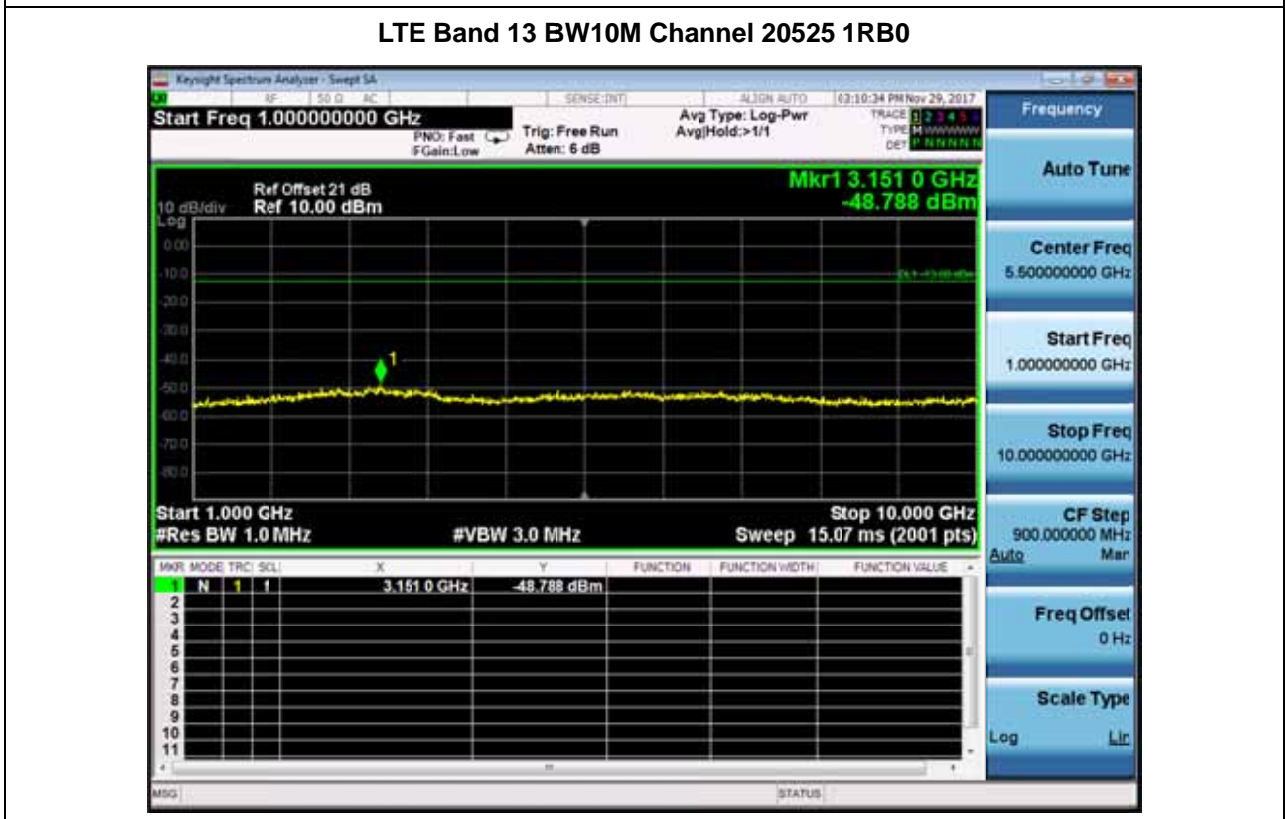
- a) The EUT was placed on a turntable with 1.5 meter height in a fully anechoic chamber.
- b) The EUT was set at 3 meters from the receiving antenna, which was mounted on the antenna tower
- c) LTE operating modes: use channel power function to test
- d) The table was rotated 360 degrees to determine the position of the highest radiated power.
- e) The height of the receiving antenna is adjusted to look for the maximum EIRP.
- f) The maximum EIRP shall be record.
- g) A dipole antenna was substituted in place of the EUT and was driven by a signal generator.
- h) The conducted power at the terminal of the dipole antenna is measured.
- i) Repeat step c) to step h) to get the maximum EIRP of the substitution antenna.
- j)  $EIRP = P_s + E_t - E_s + G_s = P_s + R_t - R_s + G_s$ .
- k)  $P_s$  (dBm) : Input power to substitution antenna
- l)  $G_s$  (dBi or dBd) : Substitution antenna Gain.
- m)  $E_t = R_t + AF$
- n)  $E_s = R_s + AF$
- o)  $AF$  (dB/m) : Receive antenna factor
- p)  $R_t$  : The highest received signal in spectrum analyzer for EUT.
- q)  $R_s$  : The highest received signal in spectrum analyzer for substitution antenna.

### 6.4. Test Result

Product	Module	Test Site	AC-5
Test Item	Conducted Spurious Emission	Date of Test	2017/11/29
Test Mode	Mode 10(QPSK)	Test engineer	Damon

Mode	Bandwidth (MHz)	Channel	Test Frequency (MHz)	RB	Measure Level (dBm)	Limit (dBm)	Result
LTE Band 13	10	20525	836.5	1RB0	-48.788	< -13	Pass
	5	23205	779.5	1RB0	-50.842	< -13	Pass
		23230	782	1RB0	-48.940	< -13	Pass
		23255	784.5	1RB0	-50.441	< -13	Pass

Note: The worst case as below:



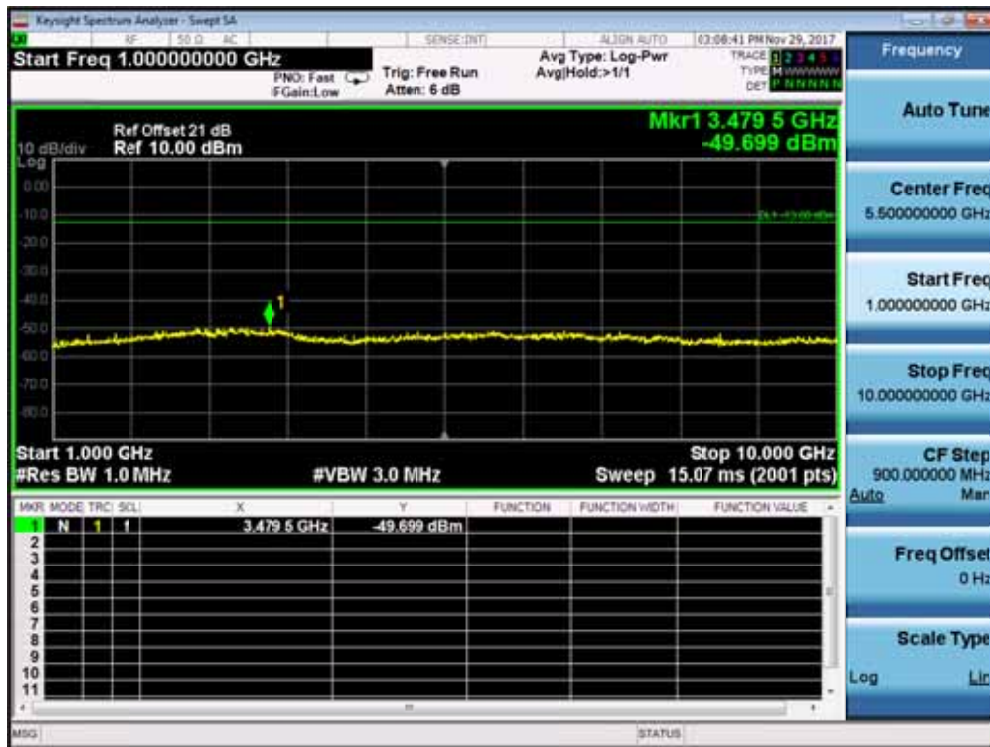


Product	Module	Test Site	AC-5
Test Item	Conducted Spurious Emission	Date of Test	2017/11/29
Test Mode	Mode 10(16QAM)	Test engineer	Damon

Mode	Bandwidth (MHz)	Channel	Test Frequency (MHz)	RB	Measure Level (dBm)	Limit (dBm)	Result
LTE Band 13	10	20525	836.5	1RB0	-50.632	< -13	Pass
		23205	779.5	1RB0	-50.159	< -13	Pass
	5	23230	782	1RB0	-49.699	< -13	Pass
		23255	784.5	1RB0	-50.257	< -13	Pass

Note: The worst case as below:

**LTE Band 13 BW5M Channel 23230 1RB0**



Product	Module		
Test Item	Radiated Spurious Emission		
Test Mode	Mode 1: GSM 850(GPRS)		
Date of Test	2017/11/29	Test Site	AC-5

Frequency (MHz)	SA Reading (dBm)	Ant.Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
Low Channel 128 (824.20MHz)								
1646.00	-36.474	H	-48.000	2.50	9.75	-40.750	-13.00	-27.75
2470.50	-53.016	H	-62.554	3.12	10.48	-55.194	-13.00	-42.194
1646.00	-29.626	V	-41.232	2.50	9.75	-33.982	-13.00	-20.982
2470.50	-48.146	V	-59.026	3.12	10.48	-51.666	-13.00	-38.666
<p>Note 1: We have evaluated low/mid/high channels, shown in the report is the worst data.</p> <p>Note 2: We also evaluate frequency range 30MHz-1GHz, but the test trace is same as the ambient noise, therefor no data appear in the report.</p>								

Product	Module		
Test Item	Radiated Spurious Emission		
Test Mode	Mode 2: PCS 1900(GPRS)		
Date of Test	2017/11/29	Test Site	AC-5

Frequency (MHz)	SA Reading (dBm)	Ant.Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
High Channel 810 (1909.80MHz)								
3818.00	-57.325	H	-66.971	4.02	12.73	-58.261	-13.00	-45.261
5727.00	-51.258	H	-56.957	4.87	13.11	-48.717	-13.00	-35.717
3818.00	-56.867	V	-66.646	4.02	12.73	-57.936	-13.00	-44.936
5727.00	-43.893	V	-50.107	4.87	13.11	-41.867	-13.00	-28.867
<p>Note 1: We have evaluated low/mid/high channels, shown in the report is the worst data.</p> <p>Note 2: We also evaluate frequency range 30MHz-1GHz, but the test trace is same as the ambient noise, therefor no data appear in the report.</p>								

Product	Module		
Test Item	Radiated Spurious Emission		
Test Mode	Mode 1: GSM 850(EDGE)		
Date of Test	2017/11/29	Test Site	AC5

Frequency (MHz)	SA Reading (dBm)	Ant.Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
Low Channel 128 (824.20MHz)								
1646.00	-29.626	H	-41.152	2.50	9.75	-33.902	-13.00	-20.902
2470.50	-48.146	H	-57.685	3.12	10.48	-50.325	-13.00	-37.325
1646.00	-29.938	V	-41.544	2.50	9.75	-34.294	-13.00	-21.294
2470.50	-48.328	V	-59.208	3.12	10.48	-51.848	-13.00	-38.848
<p>Note 1: We have evaluated low/mid/high channels, shown in the report is the worst data.</p> <p>Note 2: We also evaluate frequency range 30MHz-1GHz, but the test trace is same as the ambient noise, therefor no data appear in the report.</p>								

Product	Module		
Test Item	Radiated Spurious Emission		
Test Mode	Mode 2: PCS 1900(EDGE)		
Date of Test	2017/11/29	Test Site	AC5

Frequency (MHz)	SA Reading (dBm)	Ant.Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
High Channel 810 (1909.80MHz)								
3818.00	-52.320	H	-62.082	4.02	12.73	-53.372	-13.00	-40.372
5727.00	-51.801	H	-57.975	4.87	13.11	-49.735	-13.00	-36.735
3818.00	-50.592	V	-60.632	4.02	12.73	-51.922	-13.00	-38.922
5727.00	-47.786	V	-54.395	4.87	13.11	-46.155	-13.00	-33.155
<p>Note 1: We have evaluated low/mid/high channels, shown in the report is the worst data.</p> <p>Note 2: We also evaluate frequency range 30MHz-1GHz, but the test trace is same as the ambient noise, therefor no data appear in the report.</p>								

Product	Module		
Test Item	Radiated Spurious Emission		
Test Mode	Mode3: WCDMA Band 2 Link		
Date of Test	2017/11/29	Test Site	AC5

Frequency (MHz)	SA Reading (dBm)	Ant.Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
High Channel 9538 (1907.60MHz)								
3815.20	-59.141	H	-67.783	5.03	12.73	-60.083	-13.00	-47.083
5722.80	-57.491	H	-63.209	4.87	13.11	-54.969	-13.00	-41.969
3815.20	-58.913	V	-67.692	5.03	12.73	-59.992	-13.00	-46.992
5722.80	-56.385	V	-62.608	4.87	13.11	-54.368	-13.00	-41.368
Note 1: We have evaluated low/mid/high channels, shown in the report is the worst data.								
Note 2: We also evaluate frequency range 30MHz-1GHz, but the test trace is same as the ambient noise, therefor no data appear in the report.								

Product	Module		
Test Item	Radiated Spurious Emission		
Test Mode	Mode4: WCDMA Band 4 Link		
Date of Test	2017/11/29	Test Site	AC5

Frequency (MHz)	SA Reading (dBm)	Ant.Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
High Channel 1862 (1752.50MHz)								
3424.8	-55.484	H	-64.918	5.03	12.73	-57.218	-13	-44.218
5137.2	-57.896	H	-64.222	4.87	13.11	-55.982	-13	-42.982
3424.8	-55.741	V	-66.332	5.03	12.73	-58.632	-13	-45.632
5137.2	-57.040	V	-64.030	4.87	13.11	-55.790	-13	-42.790
Note 1: We have evaluated low/mid/high channels, shown in the report is the worst data.								
Note 2: We also evaluate frequency range 30MHz-1GHz, but the test trace is same as the ambient noise, therefor no data appear in the report.								

Product	Module		
Test Item	Radiated Spurious Emission		
Test Mode	Mode 5: WCDMA Band 5 Traffic		
Date of Test	2017/11/29	Test Site	AC5

Frequency (MHz)	SA Reading (dBm)	Ant.Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
<b>Low Channel 4132 (826.40MHz)</b>								
1654.50	-58.961	H	-69.705	3.28	9.75	-63.235	-13.00	-50.235
2479.20	-57.047	H	-65.600	4.10	10.48	-59.220	-13.00	-46.220
1654.50	-58.150	V	-68.973	3.28	9.75	-62.503	-13.00	-49.503
2479.00	-58.714	V	-68.613	4.10	10.48	-62.233	-13.00	-49.233
<p>Note 1: We have evaluated low/mid/high channels, shown in the report is the worst data.</p> <p>Note 2: We also evaluate frequency range 30MHz-1GHz, but the test trace is same as the ambient noise, therefor no data appear in the report.</p>								

Product	Module		
Test Item	Radiated Spurious Emission		
Test Mode	Mode6: LTE Band 2 Link QPSK 3MHz		
Date of Test	2017/11/28	Test Site	AC5

Frequency (MHz)	SA Reading (dBm)	Ant.Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)
<b>Low Channel 18615 (1851.5MHz) BW3MHz 1RB0</b>								
3703.00	-58.633	V	-65.551	4.76	12.73	-57.581	-13.00	-44.581
5554.50	-56.448	V	-66.922	4.81	13.20	-58.532	-13.00	-45.532
3703.00	-59.323	H	-68.553	4.83	12.73	-60.653	-13.00	-47.653
5554.50	-59.282	H	-65.952	4.87	13.18	-57.642	-13.00	-44.642
<p>Note 1: We have evaluated all bandwidth and channels by modulation of QPSK and 16QAM, shown in the report are worst data.</p> <p>Note 2: We also evaluate frequency range 30MHz-1GHz, but the test trace is same as the ambient noise, therefor no data appear in the report.</p>								

Product	Module		
Test Item	Radiated Spurious Emission		
Test Mode	Mode6: LTE Band 2 Link 16QAM 3MHz		
Date of Test	2017/11/28	Test Site	AC5

Frequency (MHz)	SA Reading (dBm)	Ant.Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)
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**Low Channel 18615 (1851.5MHz) BW3MHz 1RB0**

3703.00	-57.638	V	-66.938	4.76	12.73	-58.968	-13.00	-45.968
5554.50	-58.242	V	-64.992	4.81	13.20	-56.602	-13.00	-43.602
3703.00	-60.138	H	-66.986	4.83	12.73	-59.086	-13.00	-46.086
5554.50	-57.170	H	-67.564	4.87	13.18	-59.254	-13.00	-46.254

Note 1: We have evaluated all bandwidth and channels by modulation of QPSK and 16QAM, shown in the report are worst data.

Note 2: We also evaluate frequency range 30MHz-1GHz, but the test trace is same as the ambient noise, therefor no data appear in the report.

Product	Module		
Test Item	Radiated Spurious Emission		
Test Mode	Mode 7: LTE Band 4 Link QPSK 5MHz		
Date of Test	2017/11/28	Test Site	AC-5

Frequency (MHz)	SA Reading (dBm)	Ant.Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)
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**Mid Channel 19975 (1712.50MHz) BW5MHz 1RB0**

3425.00	-57.339	V	-67.531	4.78	12.81	-59.501	-13.00	-46.501
5137.50	-57.502	V	-64.491	4.79	12.83	-56.451	-13.00	-43.451
3425.00	-58.045	H	-67.333	4.80	12.84	-59.293	-13.00	-46.293
5137.50	-58.427	H	-65.122	4.80	12.82	-57.102	-13.00	-44.102

Note 1: We have evaluated all bandwidth and channels by modulation of QPSK and 16QAM, shown in the report are worst data.

Note 2: We also evaluate frequency range 30MHz-1GHz, but the test trace is same as the ambient noise, therefor no data appear in the report.

Product	Module		
Test Item	Radiated Spurious Emission		
Test Mode	Mode 7: LTE Band 4 Link 16QAM 5MHz		
Date of Test	2017/11/28	Test Site	AC-5

Frequency (MHz)	SA Reading (dBm)	Ant.Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)
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**Mid Channel 19975 (1712.50MHz) BW5MHz 1RB0**

3425.00	-58.789	V	-68.067	4.78	12.81	-60.037	-13.00	-47.037
5137.50	-59.173	V	-65.888	4.79	12.83	-57.848	-13.00	-44.848
3425.00	-58.102	H	-68.304	4.80	12.84	-60.264	-13.00	-47.264
5137.50	-58.837	H	-65.806	4.80	12.82	-57.786	-13.00	-44.786

Note 1: We have evaluated all bandwidth and channels by modulation of QPSK and 16QAM, shown in the report are worst data.  
 Note 2: We also evaluate frequency range 30MHz-1GHz, but the test trace is same as the ambient noise, therefor no data appear in the report.

Product	Module		
Test Item	Radiated Spurious Emission		
Test Mode	Mode 8: LTE Band 5 Link QPSK 3MHz		
Date of Test	2017/11/28	Test Site	AC-5

Frequency (MHz)	SA Reading (dBm)	Ant.Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)
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**Mid Channel 20415 (825.5MHz) BW3MHz 1RB0**

1651.00	-59.055	V	-69.800	3.28	9.75	-63.330	-13.00	-50.330
2476.50	-57.539	V	-66.114	4.18	10.58	-59.714	-13.00	-46.714
1651.00	-58.467	H	-69.341	3.31	9.83	-62.821	-13.00	-49.821
2476.50	-58.284	H	-68.154	4.15	10.50	-61.804	-13.00	-48.804

Note 1: We have evaluated all bandwidth and channels by modulation of QPSK and 16QAM, shown in the report are worst data.  
 Note 2: We also evaluate frequency range 30MHz-1GHz, but the test trace is same as the ambient noise, therefor no data appear in the report.

Product	Module		
Test Item	Radiated Spurious Emission		
Test Mode	Mode 8: LTE Band 5 Link 16QAM 3MHz		
Date of Test	2017/11/28	Test Site	AC-5

Frequency (MHz)	SA Reading (dBm)	Ant.Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)
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**Mid Channel 20415 (825.5MHz) BW3MHz 1RB0**

1651.00	-58.495	V	-69.319	3.28	9.75	-62.849	-13.00	-49.849
2476.50	-57.089	V	-67.009	4.18	10.58	-60.609	-13.00	-47.609
1651.00	-58.901	H	-69.696	3.31	9.83	-63.176	-13.00	-50.176
2476.50	-58.493	H	-67.018	4.15	10.50	-60.668	-13.00	-47.668

Note 1: We have evaluated all bandwidth and channels by modulation of QPSK and 16QAM, shown in the report are worst data.  
 Note 2: We also evaluate frequency range 30MHz-1GHz, but the test trace is same as the ambient noise, therefor no data appear in the report.

Product	Module		
Test Item	Radiated Spurious Emission		
Test Mode	Mode 9: LTE Band 12 Link QPSK10MHz		
Date of Test	2017/11/28	Test Site	AC-5

Frequency (MHz)	SA Reading (dBm)	Ant.Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)
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**Low Channel 23095 (707.50MHz) BW10MHz 1RB0**

1415.00	-57.408	V	-73.357	1.24	12.67	-61.927	-13.00	-48.927
2122.50	-58.586	V	-72.443	1.49	11.27	-62.663	-13.00	-49.663
1415.00	-58.474	H	-74.475	1.24	12.67	-63.045	-13.00	-50.045
2122.50	-57.572	H	-70.07	1.49	11.27	-60.290	-13.00	-47.29

Note 1: We have evaluated all bandwidth and channels by modulation of QPSK and 16QAM, shown in the report are worst data.  
 Note 2: We also evaluate frequency range 30MHz-1GHz, but the test trace is same as the ambient noise, therefor no data appear in the report.



Product	Module		
Test Item	Radiated Spurious Emission		
Test Mode	Mode 9: LTE Band 12 Link 16QAM10MHz		
Date of Test	2017/11/28	Test Site	AC-5

Frequency (MHz)	SA Reading (dBm)	Ant.Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)
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**Low Channel 23095 (707.50MHz) BW10MHz 1RB0**

1415.00	-58.581	V	-74.530	1.24	12.67	-63.100	-13.00	-50.100
2122.50	-58.222	V	-72.079	1.49	11.27	-62.299	-13.00	-49.299
1415.00	-58.509	H	-74.51	1.24	12.67	-63.080	-13.00	-50.080
2122.50	-56.581	H	-69.079	1.49	11.27	-59.299	-13.00	-46.299

Note 1: We have evaluated all bandwidth and channels by modulation of QPSK and 16QAM, shown in the report are worst data.

Note 2: We also evaluate frequency range 30MHz-1GHz, but the test trace is same as the ambient noise, therefor no data appear in the report.

Product	Module		
Test Item	Radiated Spurious Emission		
Test Mode	Mode 10: LTE Band 13 Link QPSK 5MHz		
Date of Test	2017/11/28	Test Site	AC-5

Frequency (MHz)	SA Reading (dBm)	Ant.Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)
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**Low Channel 23230 (772MHz) BW5MHz 1RB0**

1564.00	-58.987	V	-69.431	3.29	9.32	-63.401	-13.00	-50.401
2346.00	-59.454	V	-69.265	4.12	10.21	-63.175	-13.00	-50.175
1564.00	-58.943	H	-69.386	3.29	9.32	-63.356	-13.00	-50.356
2346.00	-58.725	H	-67.156	4.12	10.21	-61.066	-13.00	-48.066

Note 1: We have evaluated all bandwidth and channels by modulation of QPSK and 16QAM, shown in the report are worst data.

Note 2: We also evaluate frequency range 30MHz-1GHz, but the test trace is same as the ambient noise, therefor no data appear in the report.

Product	Module		
Test Item	Radiated Spurious Emission		
Test Mode	Mode 10: LTE Band 13 Link 16QAM 5MHz		
Date of Test	2017/11/28	Test Site	AC-5

Frequency (MHz)	SA Reading (dBm)	Ant.Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)
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Low Channel 23230 (772MHz) BW5MHz 1RB0								
1564.00	-58.308	V	-68.752	3.29	9.32	-62.722	-13.00	-49.722
2346.00	-58.787	V	-68.598	4.12	10.21	-62.508	-13.00	-49.508
1564.00	-58.682	H	-69.125	3.29	9.32	-63.095	-13.00	-50.095
2346.00	-59.851	H	-68.282	4.12	10.21	-62.192	-13.00	-49.192

Note 1: We have evaluated all bandwidth and channels by modulation of QPSK and 16QAM, shown in the report are worst data.

Note 2: We also evaluate frequency range 30MHz-1GHz, but the test trace is same as the ambient noise, therefor no data appear in the report.

Product	Module		
Test Item	Radiated Spurious Emission		
Test Mode	Mode 11: LTE Band 17 Link QPSK 10MHz		
Date of Test	2017/11/28	Test Site	AC-5

Frequency (MHz)	SA Reading (dBm)	Ant.Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)
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Low Channel 23800 (711MHz) BW10MHz 1RB0								
1422.00	-63.884	V	-65.327	3.25	9.21	-59.367	-13.00	-46.367
2133.00	-61.673	V	-63.626	4.08	10.11	-57.596	-13.00	-44.596
1422.00	-58.249	H	-68.780	3.25	9.21	-62.820	-13.00	-49.820
2133.00	-58.330	H	-67.076	4.08	10.11	-61.046	-13.00	-48.046

Note 1: We have evaluated all bandwidth and channels shown in the report are worst data.

Note 2: We also evaluate frequency range 30MHz-1GHz, but the test trace is same as the ambient noise, therefor no data appear in the report.

Product	Module		
Test Item	Radiated Spurious Emission		
Test Mode	Mode 11: LTE Band 17 Link 16QAM 10MHz		
Date of Test	2017/11/28	Test Site	AC-5

Frequency (MHz)	SA Reading (dBm)	Ant.Pol. (H/V)	SG Reading (dBm)	Cable Loss (dB)	Gain (dBi)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)
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**Low Channel 23800 (711MHz) BW10MHz 1RB0**

1422.00	-57.700	V	-68.177	3.25	9.21	-62.217	-13.00	-49.217
2133.00	-58.902	V	-69.009	4.08	10.11	-62.979	-13.00	-49.979
1422.00	-58.789	H	-69.320	3.25	9.21	-63.360	-13.00	-50.360
2133.00	-58.786	H	-67.532	4.08	10.11	-61.502	-13.00	-48.502

Note 1: We have evaluated all bandwidth and channels by modulation of QPSK and 16QAM, shown in the report are worst data.

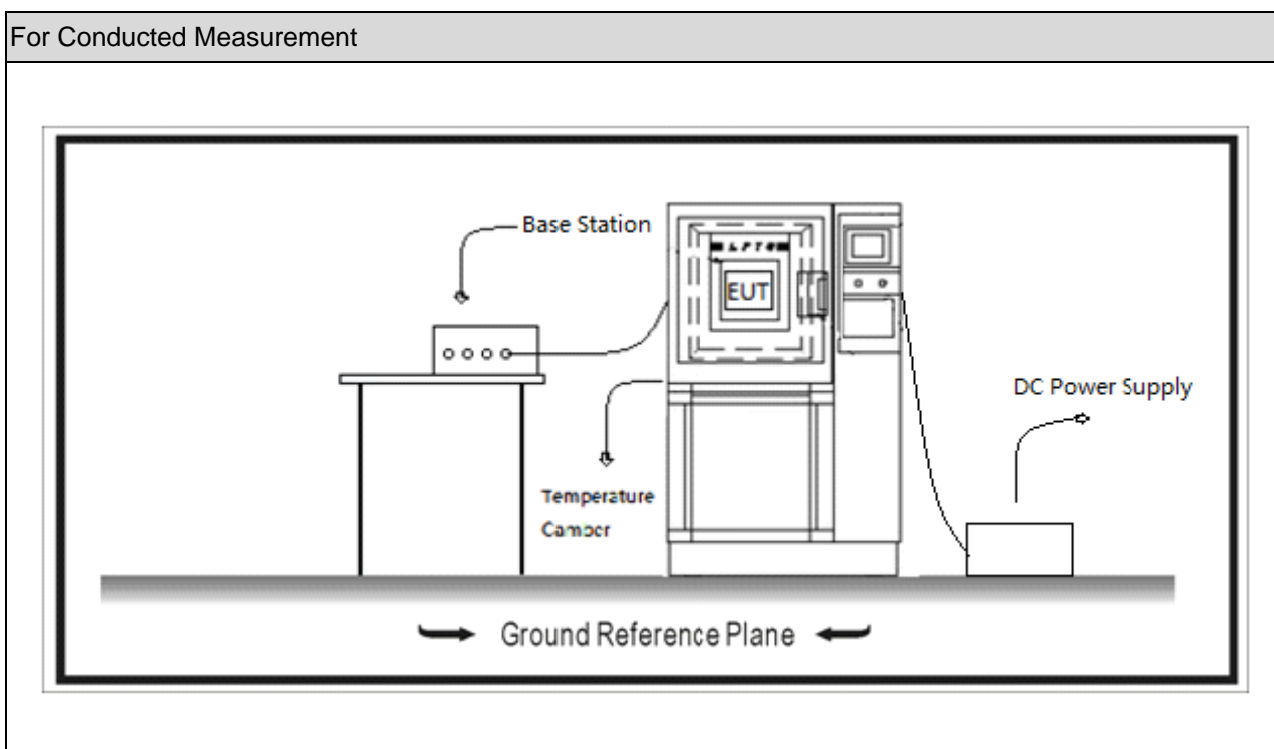
Note 2: We also evaluate frequency range 30MHz-1GHz, but the test trace is same as the ambient noise, therefor no data appear in the report.

## 7. Frequency Stability Under Temperature & Voltage Variations

### 7.1. Test Equipment

Frequency Stability Under Temperature & Voltage Variations/TR-7				
Instrument	Manufacturer	Type No.	Serial No	Cali. Due Date
PSA Series Spectrum Analyzer	Agilent	E4440A	MY49420184	2018.02.04
Radio Communication Tester	Anritsu	MT8820C	6201181503	2018.09.16
Dual Directional Coupler	Agilent	778D	20160	2018.02.04
10dB Coaxial Coupler	Agilent	87300C	MY44300299	2018.03.28
DC Power Supply	IDRC	CD-035-020PR	977272	2018.09.16
Temperature & Humidity Chamber	Gaoyu	TH-1P-B	WIT-05121302	2018.01.04
Temperature/Humidity Meter	Zhicheng	ZC1-2	AC6-TH	2018.01.05

### 7.2. Test Setup



### 7.3. Test Procedure

<b>Frequency Stability Under Temperature Variations:</b>
The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20 operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30 . After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10 increased per stage until the highest temperature of +50 reached.
<b>Frequency Stability Under Voltage Variations:</b>
Set chamber temperature to 20 . Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency. Reduce the input voltage to specify extreme voltage variation ( $\pm 15\%$ ) and endpoint, record the maximum frequency change.

#### 7.4. Test Result

Product	Module		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	Mode 10: LTE Band 13 (5M/QPSK)		
Date of Test	2017/11/28	Test Site	AC6

##### Frequency Stability under Temperature

Temperature Interval( )	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
-30	782.00	1016	± 6337.5
-20	782.00	-824	± 6337.5
-10	782.00	241	± 6337.5
0	782.00	-302	± 6337.5
10	782.00	909	± 6337.5
20	782.00	321	± 6337.5
30	782.00	420	± 6337.5
40	782.00	-626	± 6337.5
50	782.00	545	± 6337.5

##### Frequency Stability under Voltage

DC Voltage (V)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
3.3	782.00	778	± 6337.5
3.7	782.00	922	± 6337.5
4.2	782.00	-445	± 6337.5

Product	Module		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	Mode 10: LTE Band 13 (5M/16QAM)		
Date of Test	2017/11/28	Test Site	AC6

## Frequency Stability under Temperature

Temperature Interval( )	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
-30	782.00	961	± 6337.5
-20	782.00	1067	± 6337.5
-10	782.00	-443	± 6337.5
0	782.00	758	± 6337.5
10	782.00	-922	± 6337.5
20	782.00	-516	± 6337.5
30	782.00	976	± 6337.5
40	782.00	426	± 6337.5
50	782.00	-503	± 6337.5

## Frequency Stability under Voltage

DC Voltage (V)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
3.3	782.00	673	± 6337.5
3.7	782.00	-158	± 6337.5
4.2	782.00	463	± 6337.5

Product	Module		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	Mode 10: LTE Band 13 (10M/QPSK)		
Date of Test	2017/11/28	Test Site	TR7

## Frequency Stability under Temperature

Temperature Interval( )	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
-30	782.00	673	± 6337.5
-20	782.00	855	± 6337.5
-10	782.00	666	± 6337.5
0	782.00	-188	± 6337.5
10	782.00	-734	± 6337.5
20	782.00	339	± 6337.5
30	782.00	-567	± 6337.5
40	782.00	875	± 6337.5
50	782.00	886	± 6337.5

## Frequency Stability under Voltage

DC Voltage (V)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
3.3	782.00	949	± 6337.5
3.7	782.00	-133	± 6337.5
4.2	782.00	605	± 6337.5



Product	Module		
Test Item	Frequency Stability Under Temperature & Voltage Variations		
Test Mode	Mode 10: LTE Band 13 (10M/16QAM)		
Date of Test	2017/11/28	Test Site	TR7

## Frequency Stability under Temperature

Temperature Interval( )	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
-30	782.00	879	± 6337.5
-20	782.00	-369	± 6337.5
-10	782.00	212	± 6337.5
0	782.00	-375	± 6337.5
10	782.00	-230	± 6337.5
20	782.00	420	± 6337.5
30	782.00	700	± 6337.5
40	782.00	-356	± 6337.5
50	782.00	584	± 6337.5

## Frequency Stability under Voltage

DC Voltage (V)	Test Frequency (MHz)	Deviation (Hz)	Limit (Hz)
3.3	782.00	427	± 6337.5
3.7	782.00	-489	± 6337.5
4.2	782.00	-396	± 6337.5

————— The End —————