



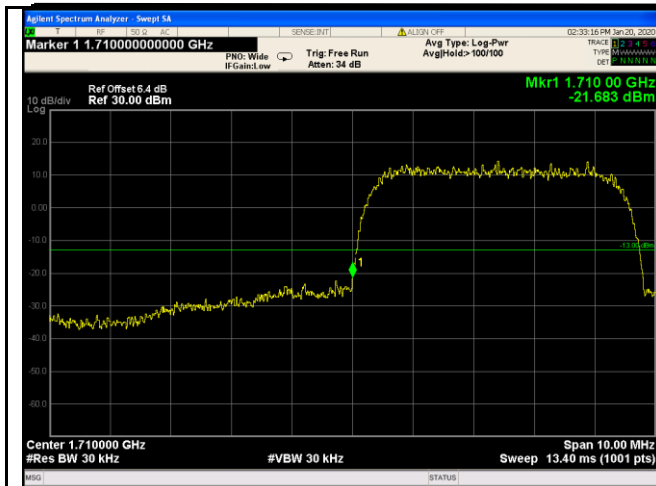
BUREAU
VERITAS

Test Report No.

Q200102S012 -FCC-R1

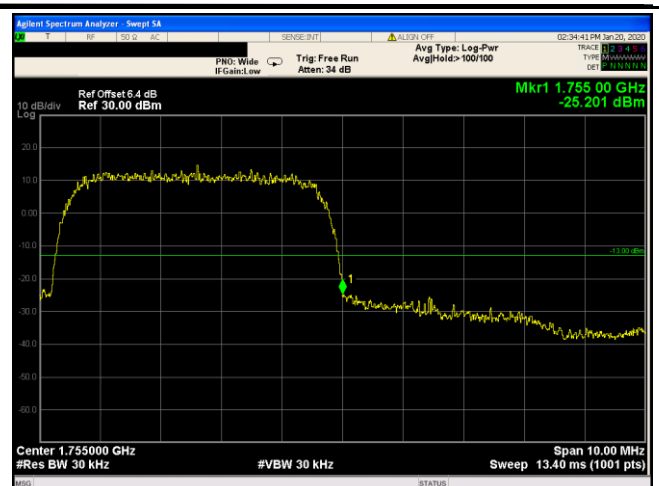
Page

76 of 91



UMTS-FDD Band IV- Low Channel

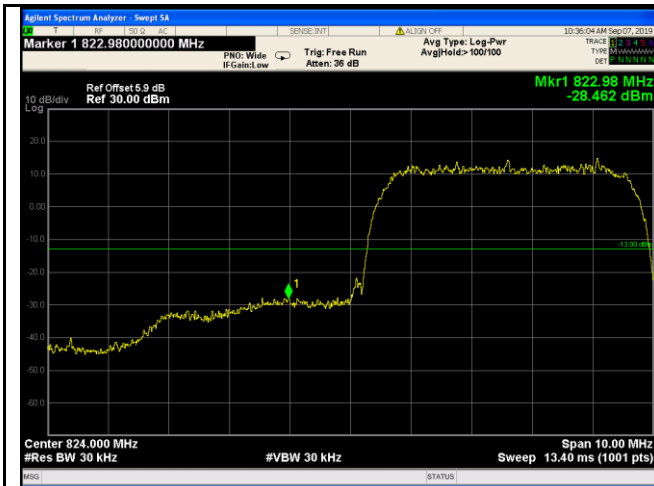
Note: Offset=Cable loss (4.5) + 10log
(46.89 /30)=4.5+1.9 =6.4dB



UMTS-FDD Band IV- High Channel

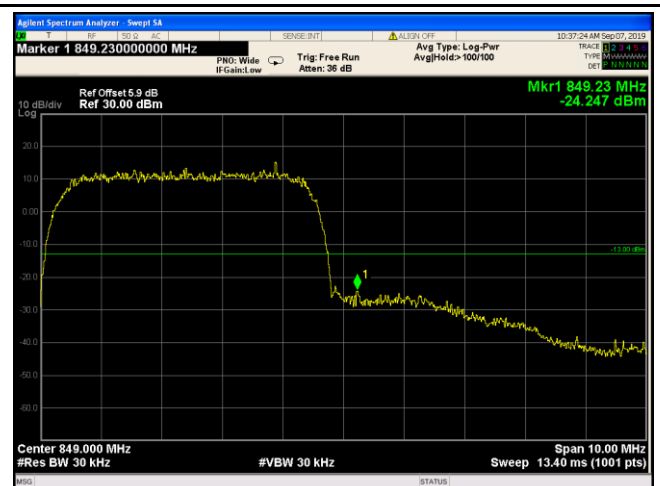
Note: Offset=Cable loss (4.5) + 10log
(46.74/30)=4.5+1.9=6.4dB

HSDPA:



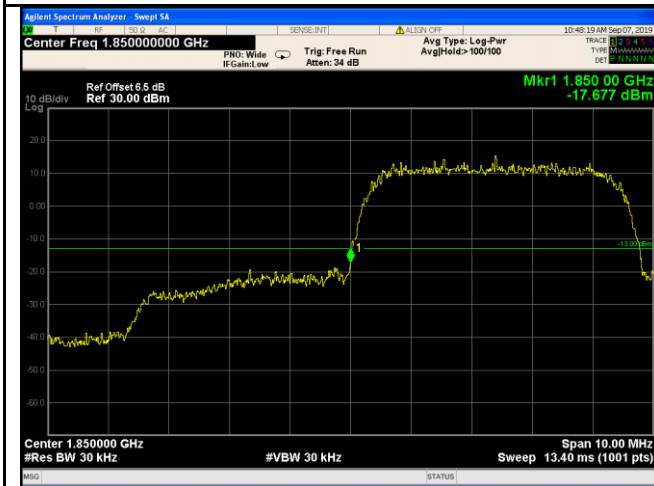
UMTS-FDD Band V - Low Channel

Note: Offset=Cable loss (4.0) + 10log
(46.78 /30)=4.0+1.9=5.9dB



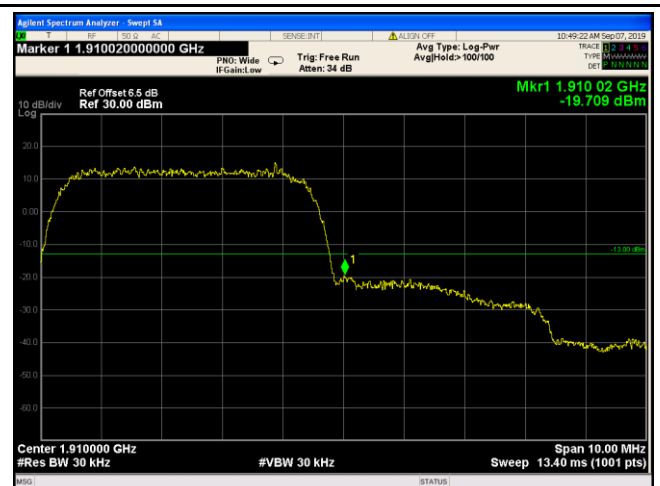
UMTS-FDD Band V - High Channel

Note: Offset=Cable loss (4.0) + 10log
(46.73/30)=4.0+1.9=5.9dB



UMTS-FDD Band II - Low Channel

Note: Offset=Cable loss (4.5) + 10log
(47.16/30)=4.5+2.0=6.5dB



UMTS-FDD Band II - High Channel

Note: Offset=Cable loss (4.5) + 10log
(47.14/30)=4.5+2.0=6.5dB



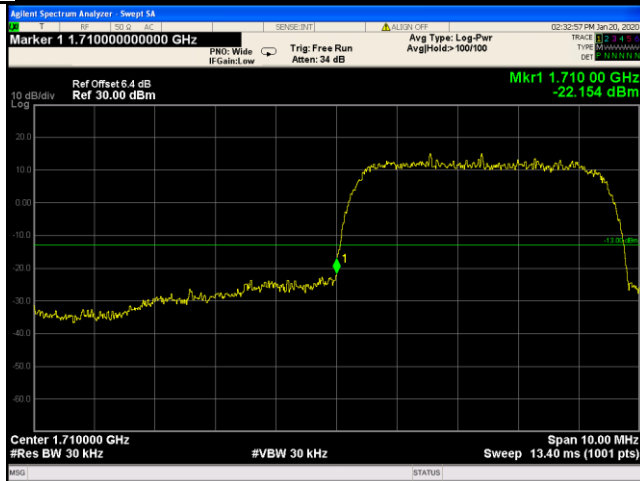
BUREAU
VERITAS

Test Report No.

Q200102S012 -FCC-R1

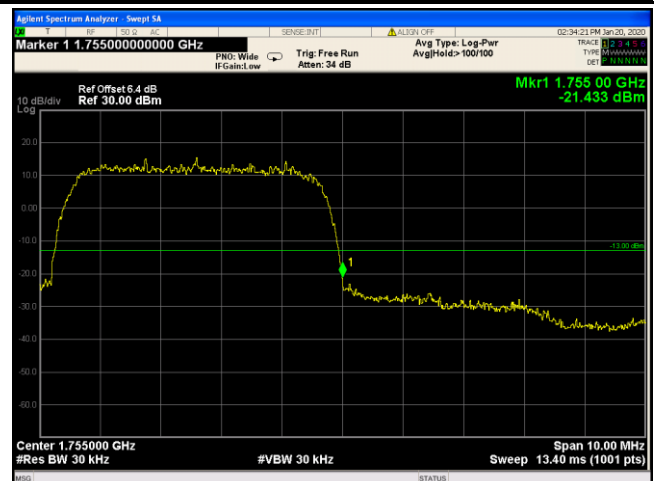
Page

78 of 91



UMTS-FDD Band IV- Low Channel

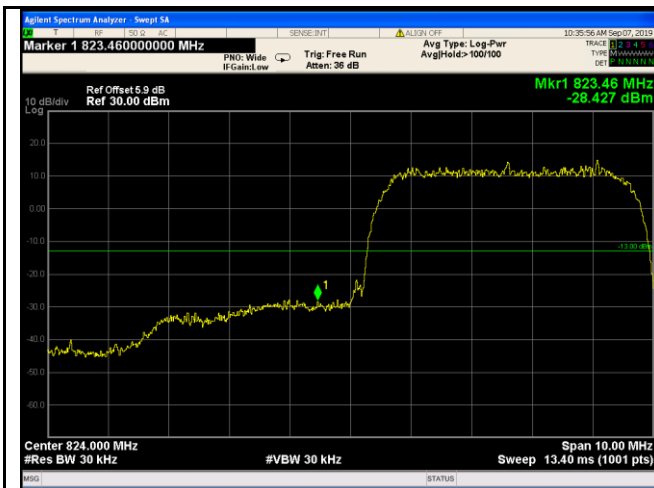
Note: Offset=Cable loss (4.5) + 10log
(46.74/30)=4.5+1.9=6.4dB



UMTS-FDD Band IV- High Channel

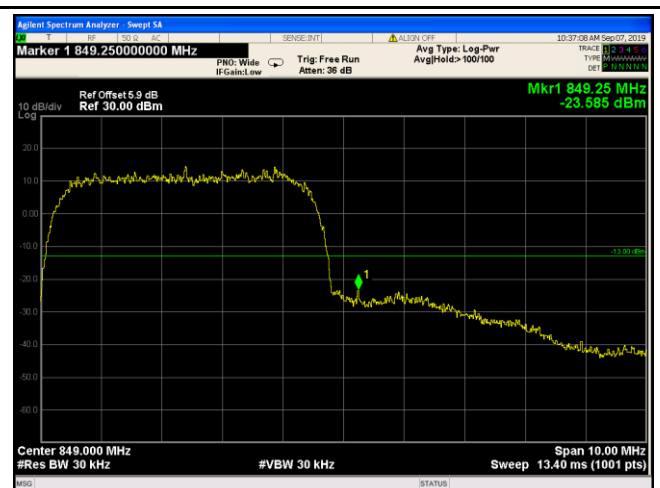
Note: Offset=Cable loss (4.5) + 10log
(46.68/30)=4.4+2.0=6.4dB

HSUPA:



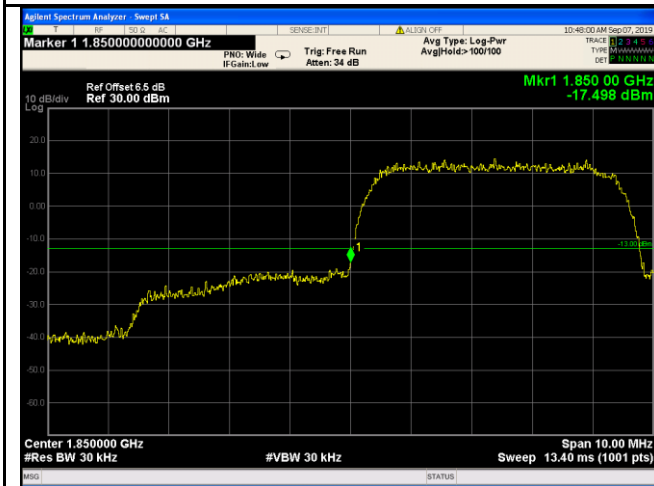
UMTS-FDD Band V - Low Channel

Note: Offset=Cable loss (4.0) + 10log
(46.82/30)=4.0+1.9=5.9dB



UMTS-FDD Band V - High Channel

Note: Offset=Cable loss (4.0) + 10log
(46.78/30)=4.0+1.9=5.9 dB



UMTS-FDD Band II - Low Channel

Note: Offset=Cable loss (4.5) + 10log
(47.19/30)=4.5+2.0=6.5dB



UMTS-FDD Band II - High Channel

Note: Offset=Cable loss (4.5) + 10log
(47.08/30)=4.5+2.0=6.5dB



BUREAU
VERITAS

Test Report No.

Q200102S012 -FCC-R1

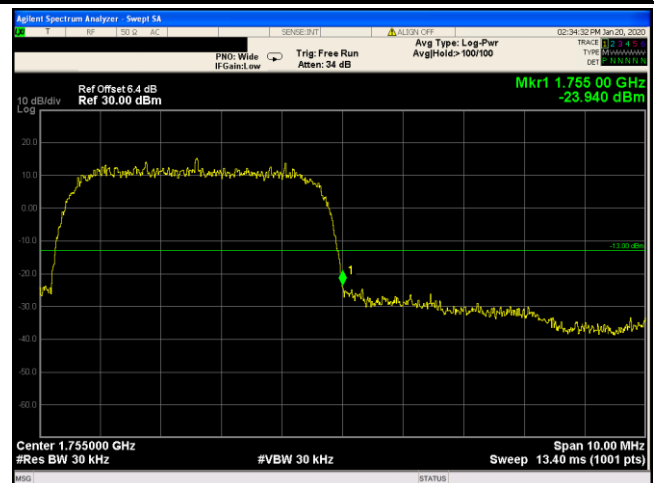
Page

80 of 91



UMTS-FDD Band IV- Low Channel

Note: Offset=Cable loss (4.5) + 10log
(46.83/30)=4.5+1.9=6.4dB



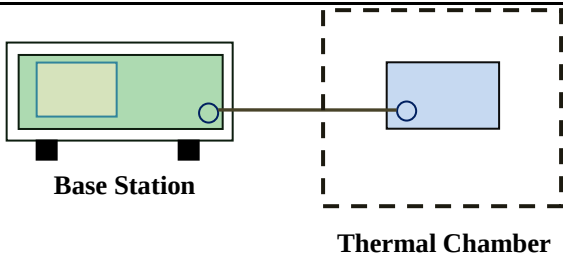
UMTS-FDD Band IV- High Channel

Note: Offset=Cable loss (4.5) + 10log
(46.76/30)=4.5+1.9=6.4dB

6.7 Frequency Stability

Temperature	26 °C
Relative Humidity	56%
Atmospheric Pressure	1023mbar
Test date :	Sep. 5,2019
Tested By :	Aaron Liang

Requirement(s):

Spec	Item	Requirement	Applicable																																
§2.1055, §22.355 & §24.235 § 27.5(h); § 27.54	a)	According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below: Frequency Tolerance for Transmitters in the Public Mobile Services <table border="1"> <thead> <tr> <th>Frequency Range (MHz)</th><th>Base, fixed (ppm)</th><th>Mobile ≥ 3 watts (ppm)</th><th>Mobile ≤ 3 watts (ppm)</th></tr> </thead> <tbody> <tr> <td>25 to 50</td><td>20.0</td><td>20.0</td><td>50.0</td></tr> <tr> <td>50 to 450</td><td>5.0</td><td>5.0</td><td>50.0</td></tr> <tr> <td>45 to 512</td><td>2.5</td><td>5.0</td><td>5.0</td></tr> <tr> <td>821 to 896</td><td>1.5</td><td>2.5</td><td>2.5</td></tr> <tr> <td>928 to 929</td><td>5.0</td><td>N/A</td><td>N/A</td></tr> <tr> <td>929 to 960.</td><td>1.5</td><td>N/A</td><td>N/A</td></tr> <tr> <td>2110 to 2220</td><td>10.0</td><td>N/A</td><td>N/A</td></tr> </tbody> </table> According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized frequency block.	Frequency Range (MHz)	Base, fixed (ppm)	Mobile ≥ 3 watts (ppm)	Mobile ≤ 3 watts (ppm)	25 to 50	20.0	20.0	50.0	50 to 450	5.0	5.0	50.0	45 to 512	2.5	5.0	5.0	821 to 896	1.5	2.5	2.5	928 to 929	5.0	N/A	N/A	929 to 960.	1.5	N/A	N/A	2110 to 2220	10.0	N/A	N/A	☒
Frequency Range (MHz)	Base, fixed (ppm)	Mobile ≥ 3 watts (ppm)	Mobile ≤ 3 watts (ppm)																																
25 to 50	20.0	20.0	50.0																																
50 to 450	5.0	5.0	50.0																																
45 to 512	2.5	5.0	5.0																																
821 to 896	1.5	2.5	2.5																																
928 to 929	5.0	N/A	N/A																																
929 to 960.	1.5	N/A	N/A																																
2110 to 2220	10.0	N/A	N/A																																
Test setup	 The diagram illustrates the test setup. On the left, a green rectangular box represents the 'Base Station'. A line connects a small circle on the right side of the Base Station to another small circle on the left side of a blue rectangular box inside a dashed-line rectangle. This dashed rectangle is labeled 'Thermal Chamber'.																																		



Test Report No.	Q200102S012 -FCC-R1
Page	82 of 91

Procedure	A communication link was established between EUT and base station. The frequency error was monitored and measured by base station under variation of ambient temperature and variation of primary supply voltage. Limit: The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ ($\pm 2.5\text{ppm}$) of the center frequency.
Remark	
Result	☒ Pass ☐ Fail

Test Data ☒ Yes ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

GSM Voice:

Cellular Band (Part 22H) result

Middle Channel, $f_0 = 836.6$ MHz				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-10	3.7	17	0.0204	2.5
0		13	0.0156	2.5
10		14	0.0168	2.5
20		13	0.0156	2.5
30		15	0.0180	2.5
40		9	0.0108	2.5
50		21	0.0251	2.5
55		17	0.0204	2.5
25	4.2	15	0.0180	2.5
	3.5	15	0.0180	2.5

PCS Band (Part 24E) result

Middle Channel, $f_0 = 1880$ MHz				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-10	3.7	13	0.0069	2.5
0		12	0.0064	2.5
10		15	0.0080	2.5
20		14	0.0074	2.5
30		13	0.0069	2.5
40		16	0.0085	2.5
50		15	0.0080	2.5
55		16	0.0085	2.5
25	4.2	18	0.0096	2.5
	3.5	19	0.0101	2.5

RMC:

UMTS-FDD Band V (Part 22H)

Middle Channel, $f_0 = 835$ MHz				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-10	3.7	22	0.0263	2.5
0		15	0.0179	2.5
10		17	0.0203	2.5
20		17	0.0203	2.5
30		15	0.0179	2.5
40		16	0.0191	2.5
50		20	0.0239	2.5
55		21	0.0251	2.5
25	4.2	17	0.0203	2.5
	3.5	17	0.0203	2.5

UMTS-FDD Band II (Part 24E)

Middle Channel, $f_0 = 1880$ MHz				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-10	3.7	22	0.0117	2.5
0		14	0.0074	2.5
10		18	0.0096	2.5
20		13	0.0069	2.5
30		17	0.0090	2.5
40		17	0.0090	2.5
50		20	0.0106	2.5
55		19	0.0101	2.5
25	4.2	19	0.0101	2.5
	3.5	20	0.0106	2.5

UMTS-FDD Band II (Part 22H)

Middle Channel, $f_0 = 835$ MHz				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-10	3.7	22	0.0263	2.5
0		14	0.0168	2.5
10		16	0.0192	2.5
20		13	0.0156	2.5
30		14	0.0168	2.5
40		16	0.0192	2.5
50		19	0.0228	2.5
55		21	0.0251	2.5
25	4.2	20	0.0240	2.5
	3.5	17	0.0204	2.5

Annex A. TEST INSTRUMENT

RE& RSE

Frequency Range Below 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESL6	1300.5001K06-100262-eQ	Apr. 04, 19	Apr. 03, 20
Bilog Antenna	Sunol Sciences	JB6	A110712	Apr. 08, 19	Apr. 07, 20
Active Antenna	CMO-POWER	AL-130	121031	Mar. 27, 19	Mar. 26, 20
Signal Amplifier	HP	8447E	443008	Mar. 28, 19	Mar. 27, 20
3m Semi-anechoic Chamber	SAEMC	9m*6m*6m	N/A	Oct. 18,18	Oct. 17,21
Test Software	EZ-EMC	ICP-03A1	N/A	N/A	N/A
Universal Radio Communication	ROHDE&SCHWARZ	CMU200	112012	Mar. 28,19	Mar. 27,20

RE& RSE

Frequency Range Above 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Spectrum	Agilent	E4446A	MY46180622	8-May-19	7-May-20
MXA signal analyzer	Agilent	N9020A	MY49100060	Mar. 28, 19	Mar. 27, 20
Horn Antenna	COM-POWER	HAH-118	71259	Mar. 22, 19	Mar. 21, 20
Horn Antenna	COM-POWER	HAH-118	71283	Mar. 20, 19	Mar. 19, 20



Test Report No.	Q200102S012 -FCC-R1
Page	87 of 91

SHF-EHF Horn	Schwarzbeck	BBHA9170	BBHA9170147	Jun. 30, 19	Jun. 29, 20
SHF-EHF Horn	Schwarzbeck	BBHA9170	BBHA9170242	Jun. 30, 19	Jun. 29, 20
AMPLIFIER	EM Electornic Corporation	EM01G26G	60613	Mar. 28, 19	Mar. 27, 20
AMPLIFIER	Emc Instruments Corporation	Emc012645	980077	Jan. 04, 19	Jan. 03,20
3m Semi-anechoic	SAEMC	9m*6m*6m	N/A	Oct. 18,18	Oct. 17,21
Test Software	EZ-EMC	ICP-03A1	N/A	N/A	N/A
Universal Radio Communication	ROHDE&SCHWARZ	CMU200	112012	Mar. 28,19	Mar. 27,20

Antenna Port Conducted RF measurement

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Wireless Connectivity	R&S	CMW270	1201.0002K75	Nov. 29, 18	Nov. 28, 19
MXA VEXTOR SIGNAL	Agilent	n5182a	MY50140530	Mar. 28,19	Mar. 27,20
MXA signal analyzer	Agilent	n9020a	MY49100060	Mar. 28,19	Mar. 27,20
RF Control Unit	Tonscend	JS0806-2	188060112	Mar. 28,19	Mar. 27,20
Signal Generation	Agilent	E4421B	US40051152	Nov. 29, 18	Nov. 28, 19
DC Power Supply	Agilent	E3640A	MY40004013	Mar. 28,19	Mar. 27,20



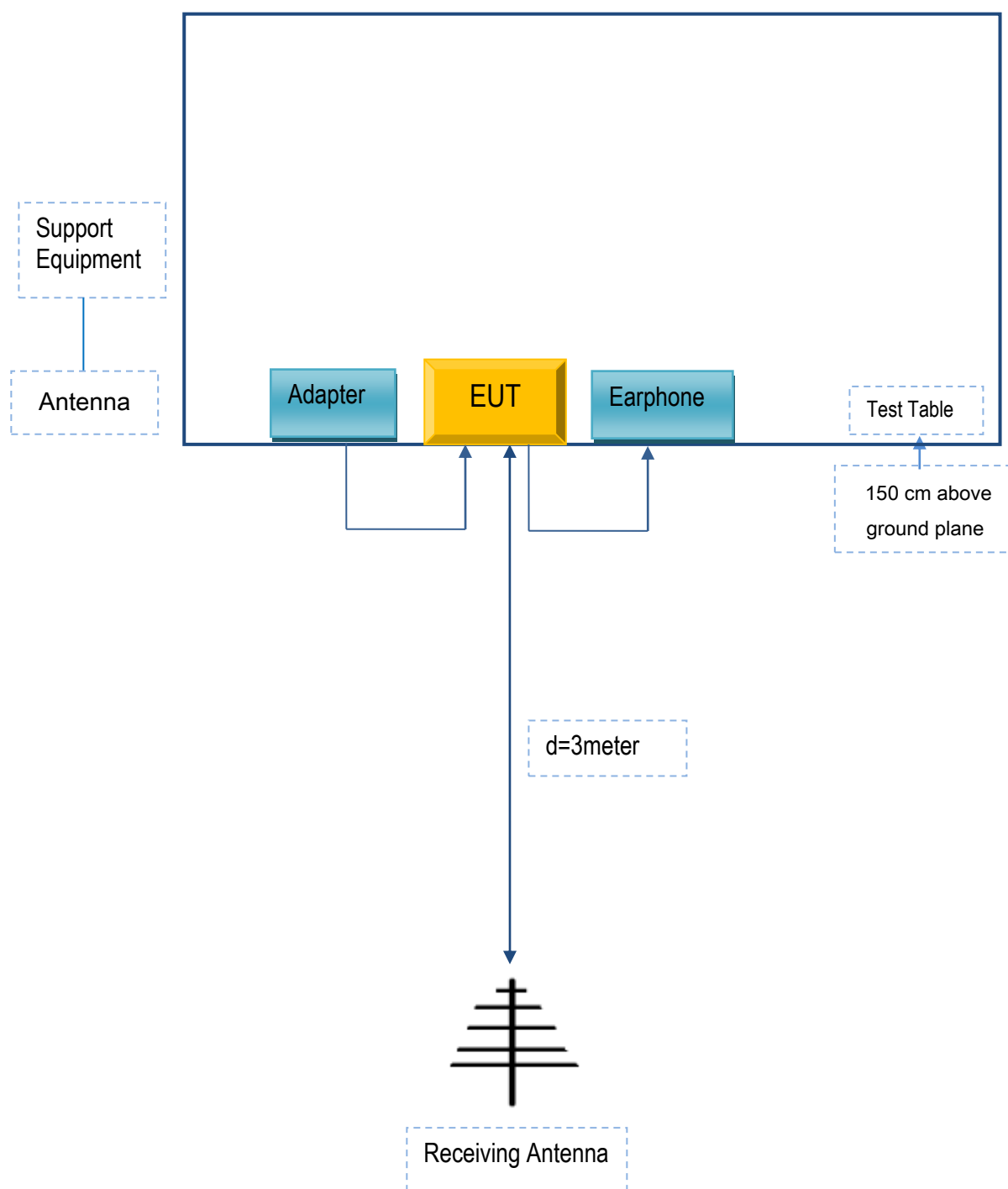
Test Report No.	Q200102S012 -FCC-R1
Page	88 of 91

Programmable Temperature &	Hongjin	HYC-TH-225DH	DG-180746	Mar. 28,19	Mar. 27,20
Test System	Tonscend	JS 1120-3	N/A	N/A	N/A
Power Splitter	Weinschel	1580-1	TL177	Mar. 20,19	Mar. 19,20
Universal Radio Communication	ROHDE&SCHWARZ	CMU200	112012	Mar. 28,19	Mar. 27,20
Universal Radio Communication	ROHDE&SCHWARZ	CMU200	121393	Mar. 28,19	Mar. 27,20
Wireless Communication Test Set	ROHDE&SCHWARZ	CMW500	1201.0002K500-155842-Gd	Aug. 06, 19	Aug. 05, 20

Annex B. TEST SETUP AND SUPPORTING EQUIPMENT

Annex B.i. TEST SET UP BLOCK

Block Configuration Diagram for Radiated Emissions





Test Report No.	Q200102S012 -FCC-R1
Page	90 of 91

Annex C. SUPPORTING EQUIPMENT DESCRIPTION

The following is a description of supporting equipment and details of cables used with the EUT.

Supporting Equipment:

Manufacturer	Equipment Description	Model	Serial No
N/A	N/A	N/A	N/A

Supporting Cable:

Cable type	Shield Type	Ferrite Core	Length	Serial No
N/A	N/A	N/A	N/A	N/A



Test Report No.

Q200102S012 -FCC-R1

Page

91 of 91

Annex C. User Manual / Block Diagram / Schematics / Partlist/ DECLARATION OF SIMILARITY

Please see the attachment