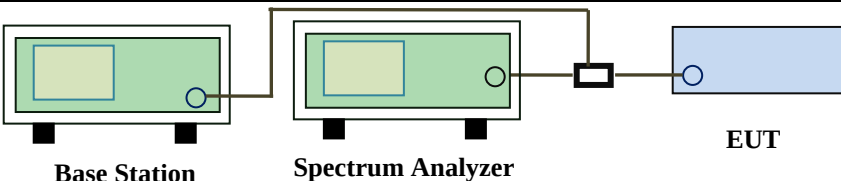


6.7 Band Edge

Temperature	25 °C
Relative Humidity	53%
Atmospheric Pressure	1005mbar
Test date :	February 01, 2018
Tested By :	Aaron Liang

Requirement(s):

Spec	Item	Requirement	Applicable
§22.917(a) §24.238(a) § 27.53(h)	a)	The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB.	☒
Test setup	 Base Station Spectrum Analyzer EUT		
Procedure	- The EUT was connected to Spectrum Analyzer and Base Station via power divider. - The Band Edges of low and high channels for the highest RF powers were measured. Setting RBW as roughly BW/100.		
Remark			
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

GPRS:

Cellular Band (Part 22H) result

Frequency (MHz)	Emission (dBm)	Limit (dBm)
823.982	-14.164	-13
849.016	-14.987	-13

PCS Band (Part24E) result

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1849.978	-15.971	-13
1910.022	-17.406	-13

EGPRS (MCS5):

Cellular Band (Part 22H) result

Frequency (MHz)	Emission (dBm)	Limit (dBm)
823.984	-15.146	-13
849.006	-13.728	-13

PCS Band (Part24E) result

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1849.978	-16.422	-13
1910.023	-15.264	-13

RCM:

UMTS-FDD Band V (Part 22H)

Frequency (MHz)	Emission (dBm)	Limit (dBm)
823.95	-19.570	-13
849.06	-20.975	-13

UMTS-FDD Band II (Part 24E)

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1849.01	-22.878	-13
1910.76	-22.308	-13

UMTS-FDD Band IV (Part 27)

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1708.95	-27.957	-13
1756.17	-24.659	-13

HSUPA:

UMTS-FDD Band V (Part 22H)

Frequency (MHz)	Emission (dBm)	Limit (dBm)
823.95	-20.904	-13
849.04	-22.048	-13

UMTS-FDD Band II (Part 24E)

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1849.08	-20.093	-13
1910.02	-20.282	-13

UMTS-FDD Band IV (Part 27)

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1709.13	-27.521	-13
1756.18	-24.380	-13

HSDPA:

UMTS-FDD Band V (Part 22H)

Frequency (MHz)	Emission (dBm)	Limit (dBm)
823.07	-19.967	-13
849.01	-21.968	-13

UMTS-FDD Band II (Part 24E)

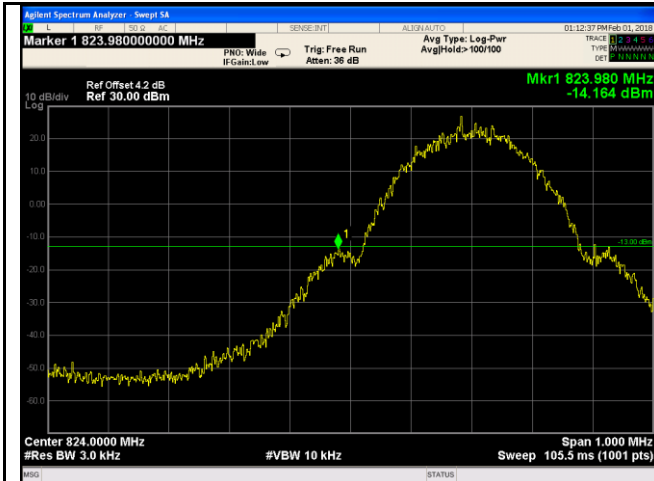
Frequency (MHz)	Emission (dBm)	Limit (dBm)
1849.10	-20.342	-13
1910.04	-21.602	-13

UMTS-FDD Band IV (Part 27)

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1709.14	-27.727	-13
1756.18	-27.728	-13

GPRS:

Test Plots



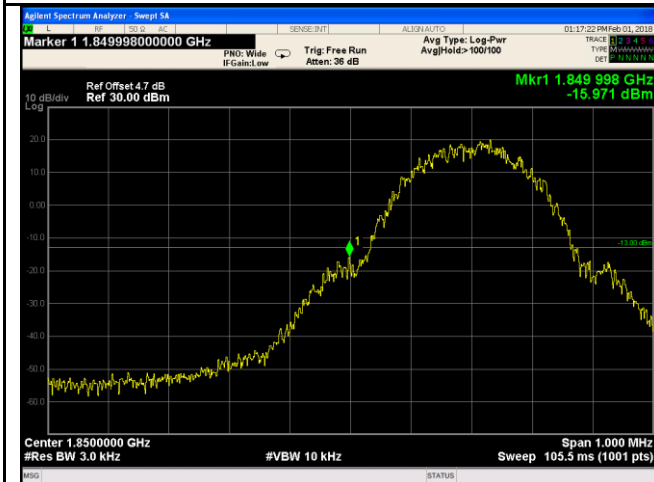
Cellular Band - Low Channel

Note: Offset=Cable loss (4.0) + 10log
(3.13/3)=4.0+0.2=4.2dB



Cellular Band - High Channel

Note: Offset=Cable loss (4.0) + 10log
(3.11/3)=4.0+0.2=4.2dB



PCS Band - Low Channel

Note: Offset=Cable loss (4.5) + 10log
(3.12/3)=4.5+0.2=4.7dB

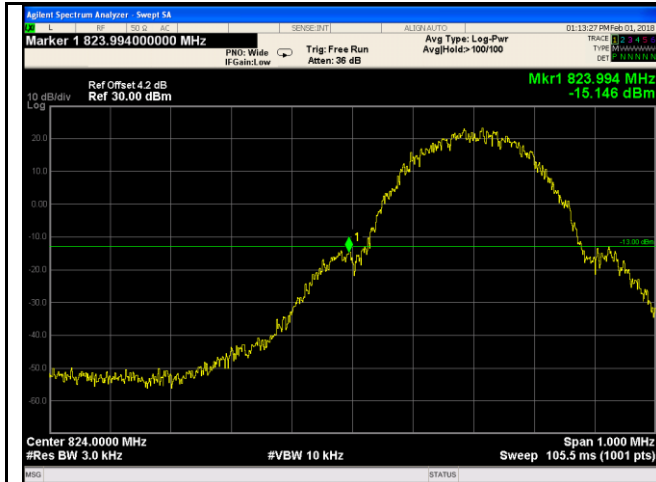


PCS Band - High Channel

Note: Offset=Cable loss (4.5) + 10log
(3.16/3)=4.5+0.2=4.7dB

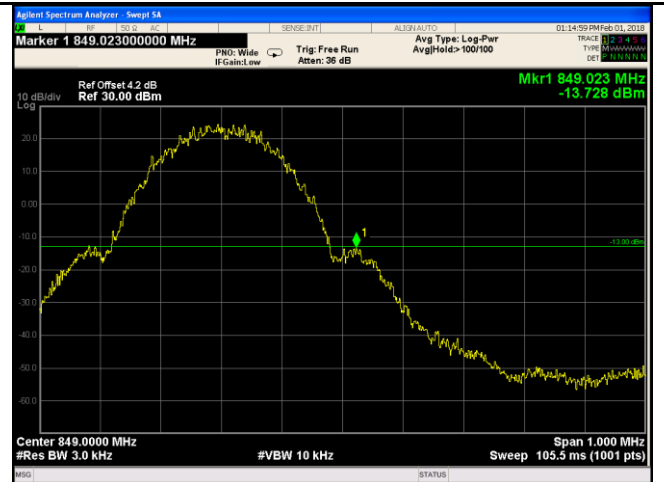
EGPRS (MCS5):

Test Plots



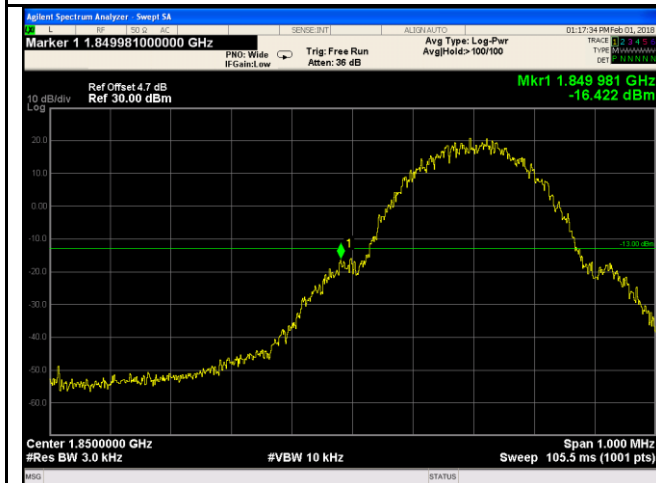
Cellular Band - Low Channel

Note: Offset=Cable loss (4.0) + 10log
(3.16/3)=4.0+0.2=4.2dB



Cellular Band - High Channel

Note: Offset=Cable loss (4.0) + 10log
(3.16/3)=4.0+0.2=4.2dB



PCS Band - Low Channel

Note: Offset=Cable loss (4.5) + 10log
(3.13/3)=4.5+0.2=4.7dB



PCS Band - High Channel

Note: Offset=Cable loss (4.5) + 10log
(3.17/3)=4.5+0.2=4.7dB

RMC:



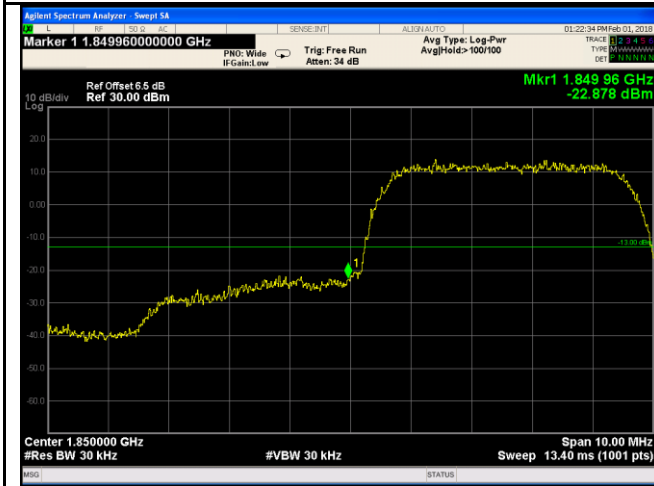
UMTS-FDD Band V - Low Channel

Note: Offset=Cable loss (4.0) + 10log
(46.95/30)=4.0+2.1=6.1 dB



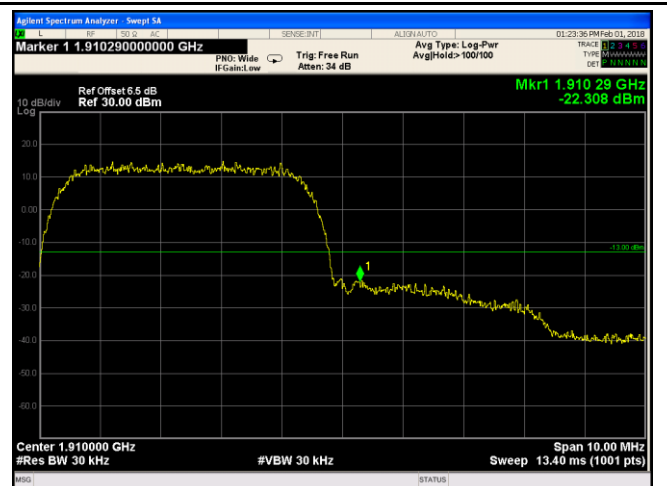
UMTS-FDD Band V - High Channel

Note: Offset=Cable loss (4.0) + 10log
(47.17/30)=4.0+2.1=6.1 dB



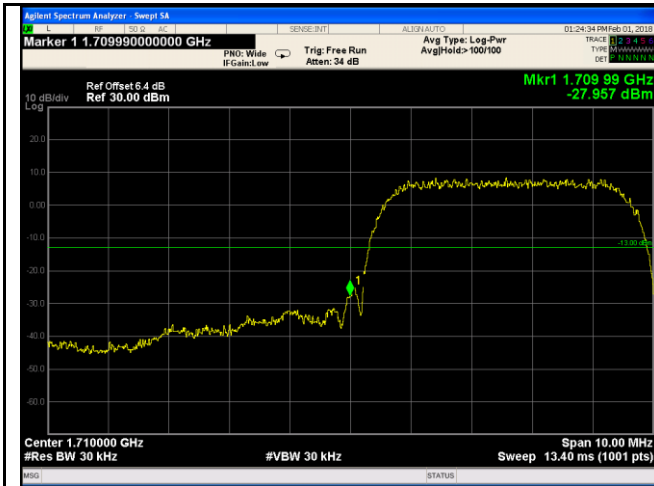
UMTS-FDD Band II - Low Channel

Note: Offset=Cable loss (4.5) + 10log
(47.43/30)=4.5+2.0=6.5dB



UMTS-FDD Band II - High Channel

Note: Offset=Cable loss (4.5) + 10log
(47.75/30)=4.5+2.0=6.5 dB



UMTS-FDD Band IV - Low Channel

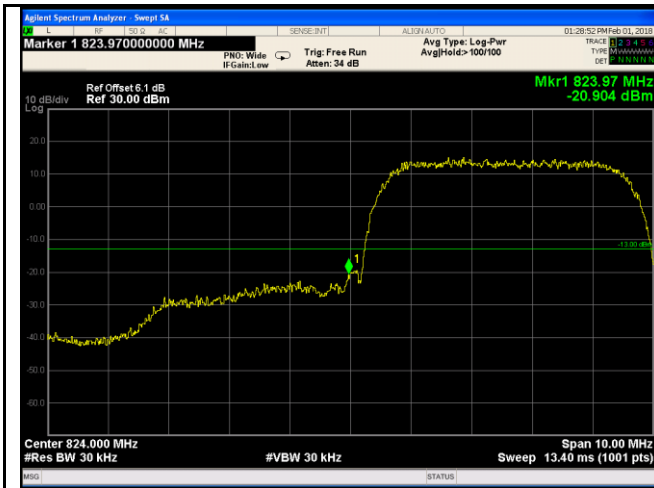
Note: Offset=Cable loss (4.5) + 10log
(46.79/30)=4.5+1.9=6.4 dB



UMTS-FDD Band IV - High Channel

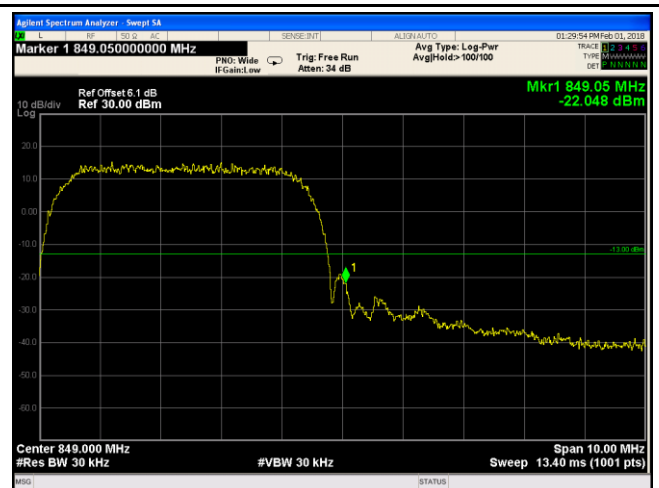
Note: Offset=Cable loss (4.0) + 10log
(47.13/30)=4.5+1.9=6.4 dB

HSUPA:



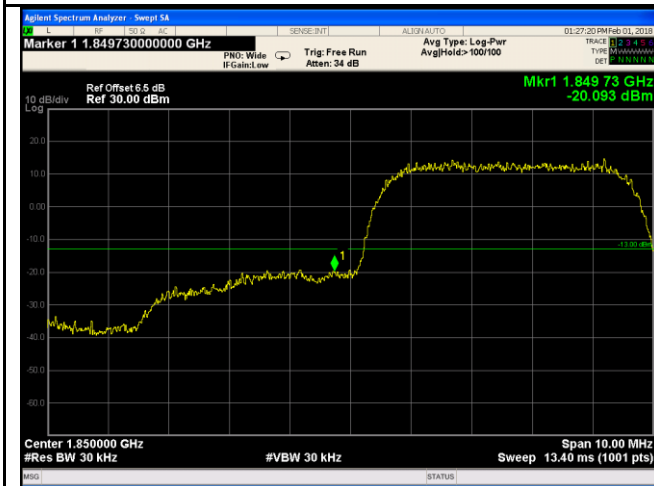
UMTS-FDD Band V - Low Channel

Note: Offset=Cable loss (4.0) + 10log
(47.01/30)=4.0+2.1=6.1 dB



UMTS-FDD Band V - High Channel

Note: Offset=Cable loss (4.0) + 10log
(47.02/30)=4.0+2.1=6.1 dB



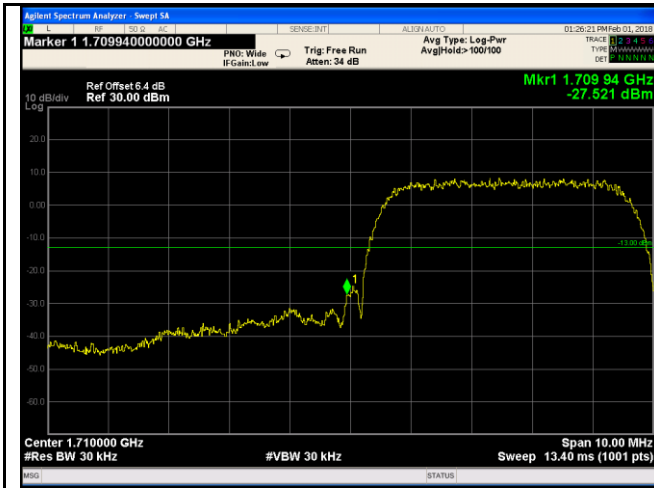
UMTS-FDD Band II - Low Channel

Note: Offset=Cable loss (4.5) + 10log
(47.58/30)=4.5+2.0=6.5dB



UMTS-FDD Band II - High Channel

Note: Offset=Cable loss (4.5) + 10log
(47.53/30)=4.5+2.0=6.5dB



UMTS-FDD Band IV - Low Channel

Note: Offset=Cable loss (4.5) + 10log
(47.06/30)=4.5+1.9=6.4 dB



UMTS-FDD Band IV - High Channel

Note: Offset=Cable loss (4.5) + 10log
(47.10/30)=4.5+1.9=6.4 dB

HSDPA:



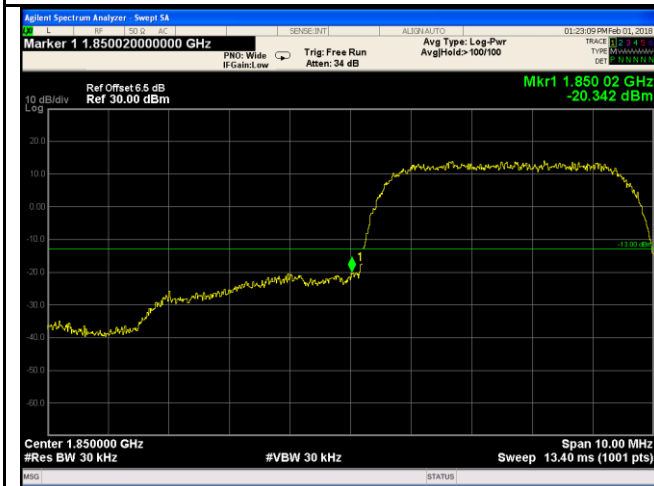
UMTS-FDD Band V - Low Channel

Note: Offset=Cable loss (4.0) + 10log
(47.24/30)=4.0+2.1=6.1 dB



UMTS-FDD Band V - High Channel

Note: Offset=Cable loss (4.0) + 10log
(47.22/30)=4.0+2.1=6.1 dB



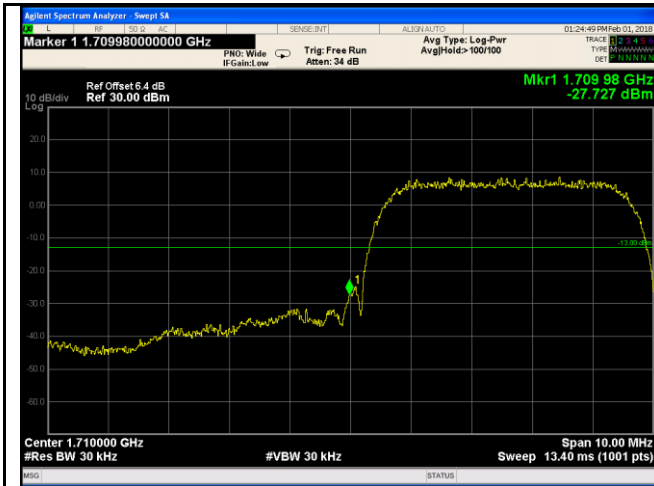
UMTS-FDD Band II - Low Channel

Note: Offset=Cable loss (4.5) + 10log
(47.30/30)=4.5+2.0=6.5dB



UMTS-FDD Band II - High Channel

Note: Offset=Cable loss (4.5) + 10log
(47.49/30)=4.5+2.0=6.5dB



UMTS-FDD Band IV - Low Channel

Note: Offset=Cable loss (4.5) + 10log
(46.96/30)=4.5+1.9=6.4 dB



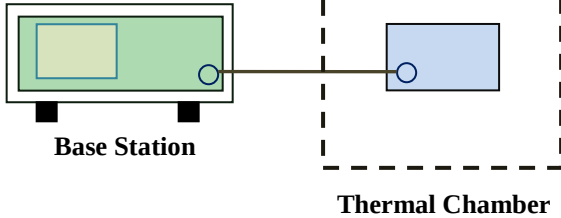
UMTS-FDD Band IV - High Channel

Note: Offset=Cable loss (4.5) + 10log
(47.02/30)=4.5+1.9=6.4dB

6.8 Frequency Stability

Temperature	24 °C
Relative Humidity	54%
Atmospheric Pressure	1020mbar
Test date :	January 29, 2018
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>450 to 512</td><td>2.5</td><td>5.0</td><td>10</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 960</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	450 to 512	2.5	5.0	10	821 to 896	1.5	2.5	2.5	928 to 960	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																																
450 to 512	2.5	5.0	10																																
821 to 896	1.5	2.5	2.5																																
928 to 960	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 shows a Base Station (represented by a green rectangle with a smaller green rectangle inside) connected by a line to a Thermal Chamber (represented by a blue rectangle inside a dashed-line box). Both components have a small circle representing an antenna or connection point.																																		

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

WCDMA:

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	19	0.0227	2.5
0		17	0.0203	2.5
10		17	0.0203	2.5
20		13	0.0155	2.5
30		16	0.0191	2.5
40		17	0.0203	2.5
50		22	0.0263	2.5
55		18	0.0215	2.5
25	4.2	20	0.0239	2.5
	3.5	17	0.0203	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	12	0.0064	2.5
0		15	0.0080	2.5
10		13	0.0069	2.5
20		13	0.0069	2.5
30		15	0.0080	2.5
40		15	0.0080	2.5
50		18	0.0096	2.5
55		17	0.0090	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	15	0.0180	2.5
0		15	0.0180	2.5
10		18	0.0216	2.5
20		14	0.0168	2.5
30		12	0.0144	2.5
40		8	0.0096	2.5
50		19	0.0228	2.5
55		13	0.0156	2.5
25	4.2	18	0.0216	2.5
	3.5	16	0.0192	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	18	0.0096	2.5
0		18	0.0096	2.5
10		17	0.0090	2.5
20		16	0.0085	2.5
30		15	0.0080	2.5
40		17	0.0090	2.5
50		21	0.0112	2.5
55		19	0.0101	2.5
25	4.2	18	0.0096	2.5
	3.5	16	0.0085	2.5

UMTS-FDD Band IV (Part 27)

Middle Channel, $f_0 = 1733$ 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	0.0180	2.5
10		17	0.0204	2.5
20		16	0.0192	2.5
30		16	0.0192	2.5
40		15	0.0180	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

Instrument	Model	Serial #	Cal Date	Cal Due	In use
RF Conducted Test					
Agilent ESA-E SERIES SPECTRUM ANALYZER	E4407B	MY45108319	09/14/2017	09/13/2018	☒
Power Splitter	1#	1#	08/30/2017	08/29/2018	☒
Universal Radio Communication Tester	CMU200	121393	09/23/2017	09/22/2018	☒
Temperature/Humidity Chamber	UHL-270	001	10/07/2017	10/06/2018	☒
DC Power Supply	E3640A	MY40004013	09/15/2017	09/14/2018	☒
RF Power Sensor	Dare RPR3006C/P/W	AY554013	09/15/2017	09/14/2018	☒
Radiated Emissions					
EMI test receiver	ESL6	100262	09/15/2017	09/14/2018	☒
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	08/30/2017	08/29/2018	☒
Horn Antenna	BBHA9170	3145226D1	09/27/2017	09/26/2018	☒
Microwave Preamplifier (1 ~ 26.5GHz)	8449B	3008A02402	03/23/2017	03/22/2018	☒
Bilog Antenna (30MHz~6GHz)	JB6	A110712	09/19/2017	09/18/2018	☒
Bilog Antenna (30MHz~2GHz)	JB1	A112017	09/19/2017	09/18/2018	☒
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71259	09/22/2017	09/21/2018	☒
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	09/22/2017	09/21/2018	☒
SYNTHESIZED SIGNAL GENERATOR	8665B	3744A01293	09/15/2017	09/14/2018	☒
Power Amplifier	SMC150D	R1553-0313	03/08/2017	03/07/2018	☒
Power Amplifier	S61-25	R1553-0516	05/26/2017	05/25/2018	☒
Power Amplifier	S41-25D	R1553-0314	05/26/2017	05/25/2018	☒

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Tunable Notch Filter	3NF-800/1000-S	AA4	08/30/2017	08/29/2018	☒
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Annex B. EUT And Test Setup Photographs

Annex B.i. Photograph: EUT External Photo

EUT - Front View



EUT - Rear View



EUT - Top View



EUT - Bottom View



EUT - Left View



EUT - Right View



Annex B.ii. Photograph: EUT Internal Photo

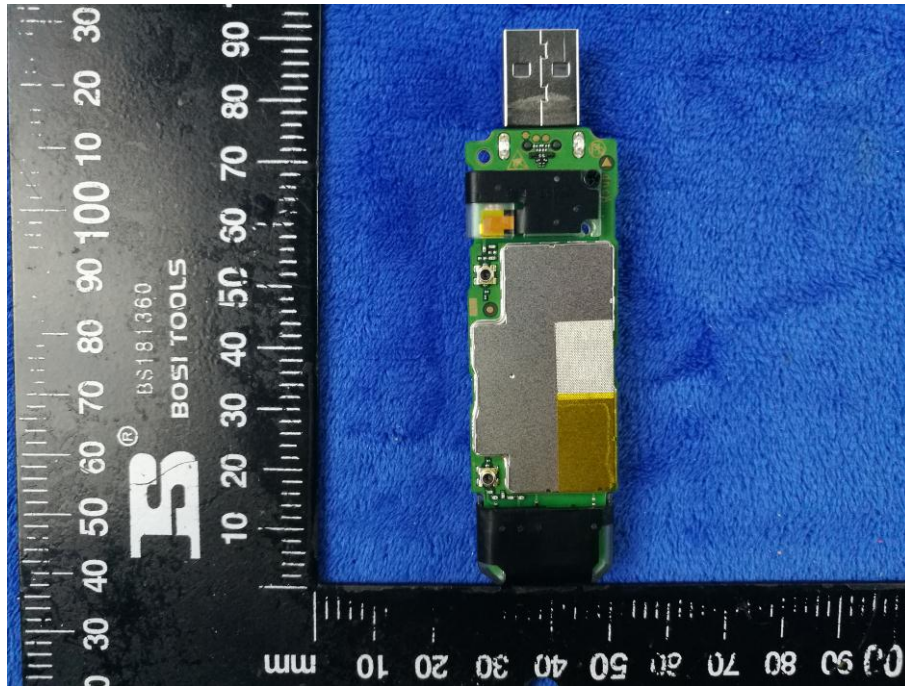
Cover Off - Top View 1



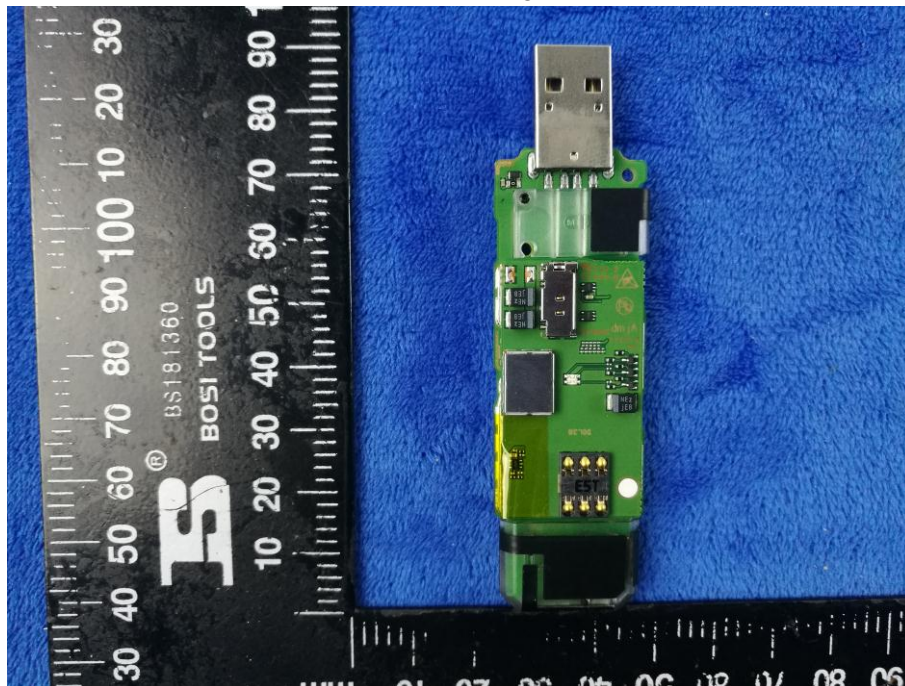
Cover Off - Top View 2



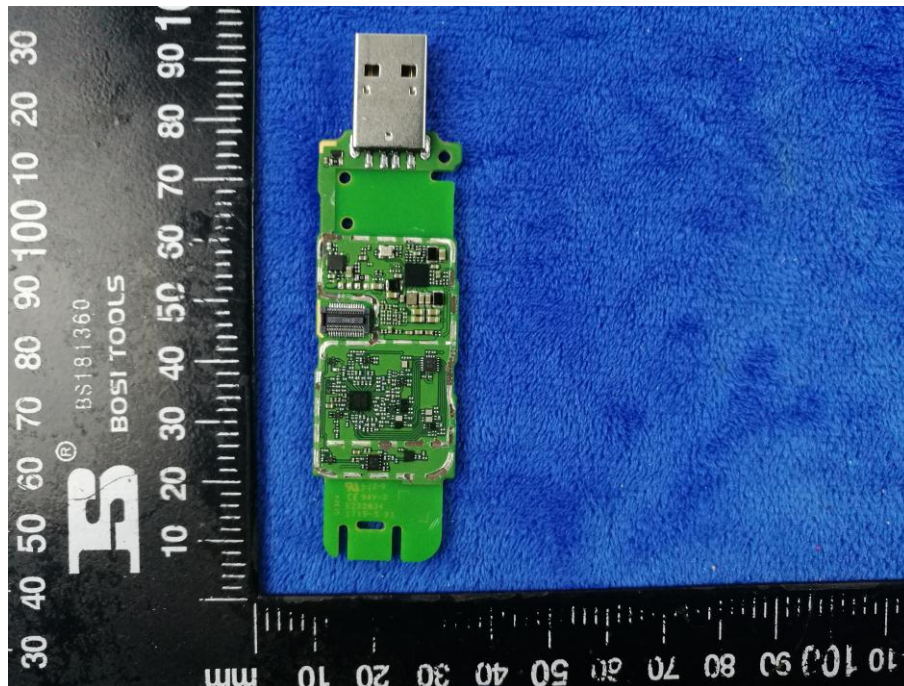
Mainboard with Shielding - Front View



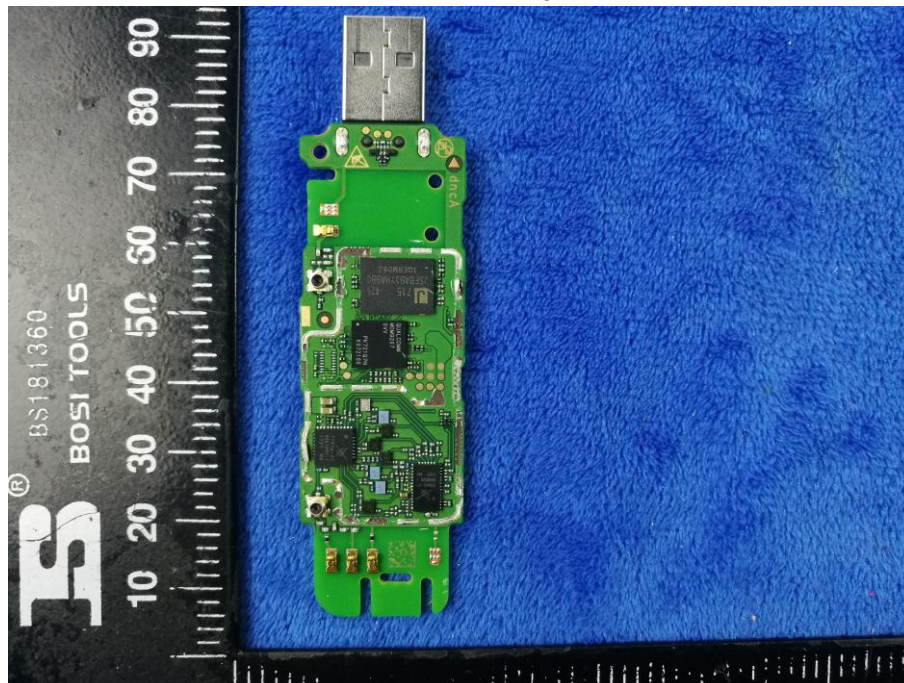
Mainboard with Shielding - Rear View



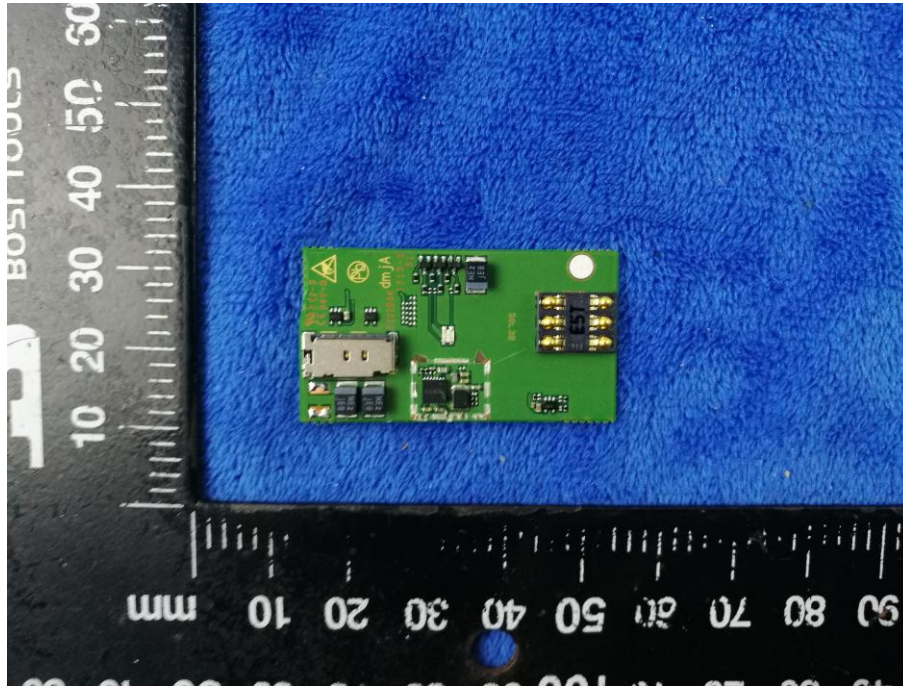
Mainboard without Shielding - Front View



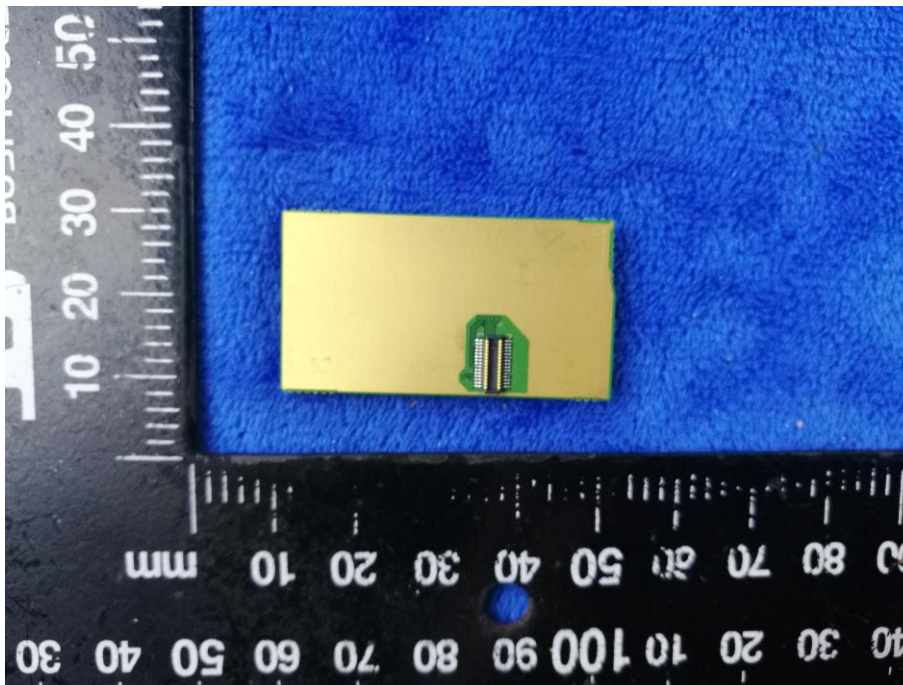
Mainboard without Shielding - Rear View



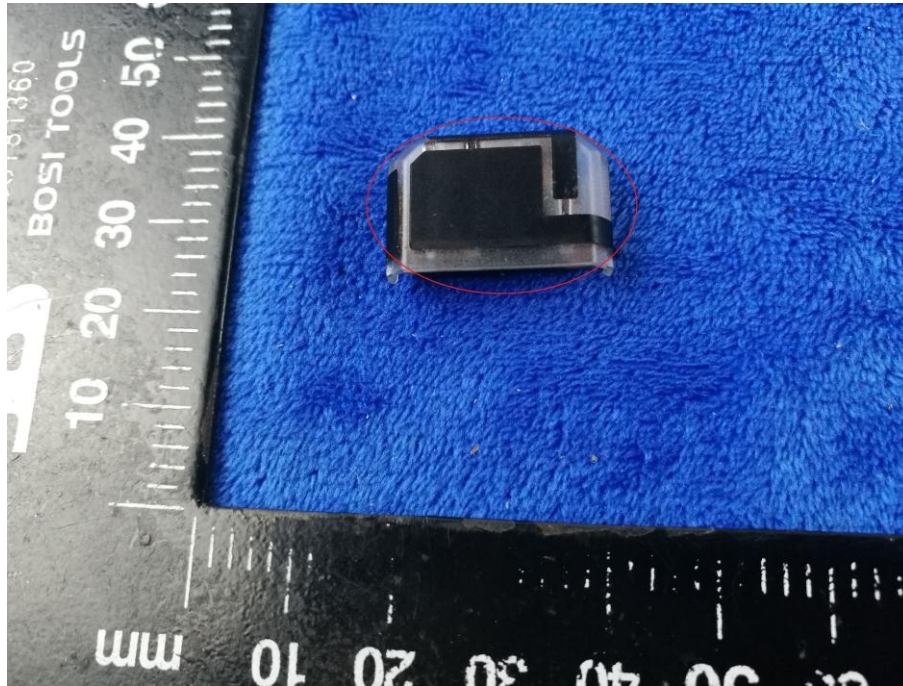
Small board - Front View



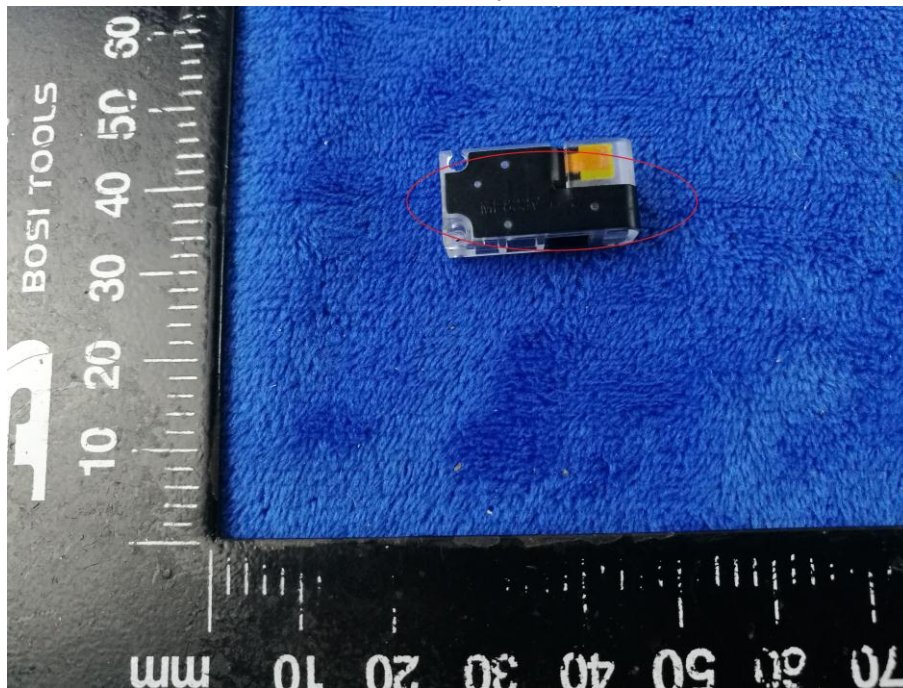
Small board - Rear View



GSM/PCS/UMTS-FDD/LTE Antenna View



Receive Diversity Antenna



Annex B.iii. Photograph: Test Setup Photo



Radiated Spurious Emissions Test Setup Below 1GHz

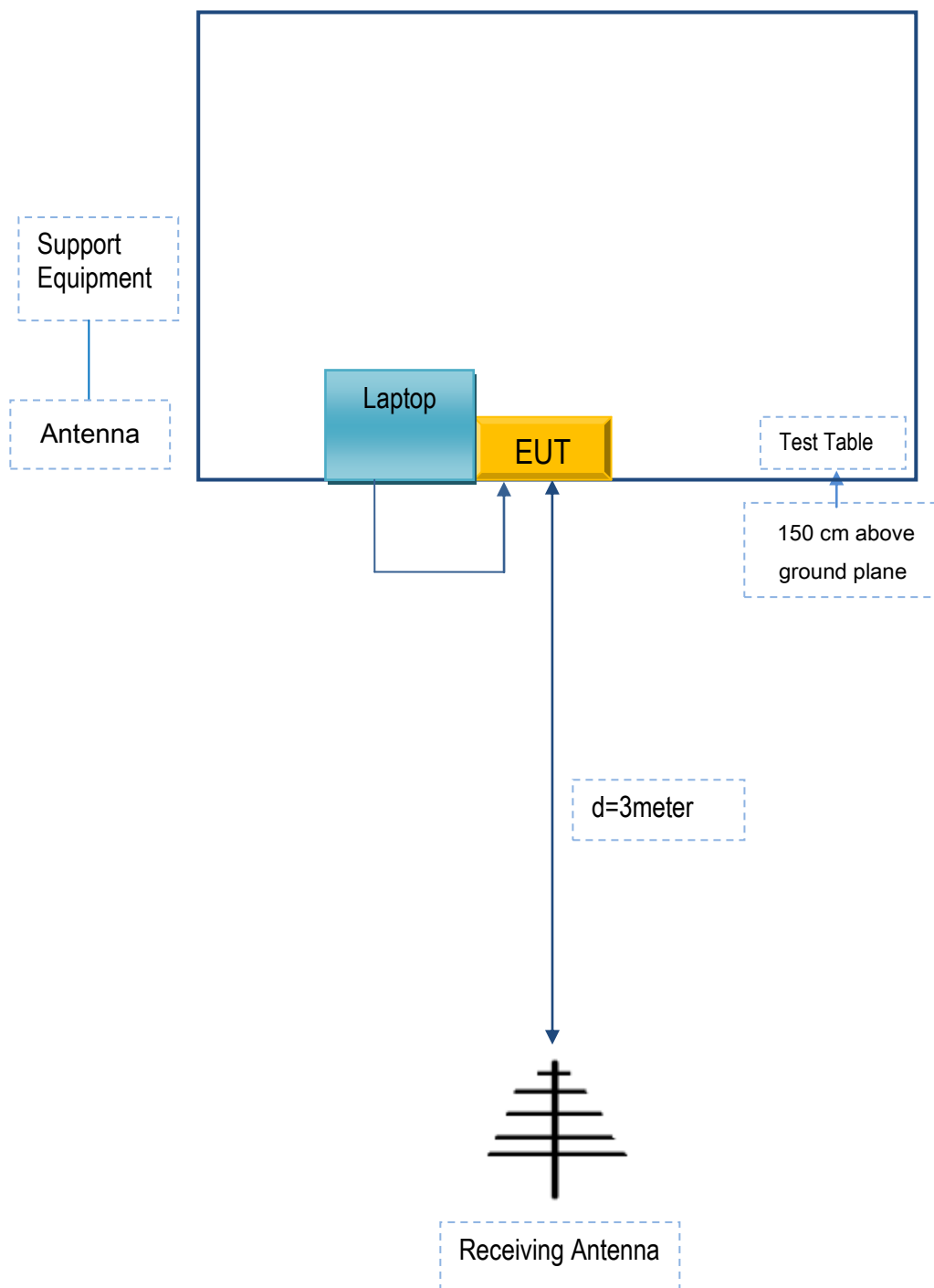


Radiated Spurious Emissions Test Setup Above
1GHz

Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

Annex C.ii. TEST SET UP BLOCK

Block Configuration Diagram for Radiated Emissions



Annex C. ii. 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
Cherry mobile	Adapter	CM-1000	N/A
Agilent	Wireless Connectivity Test Set	N4010A	N/A
OEM	omnidirectional antenna	AntSuck	N/A

Supporting Cable:

Cable type	Shield Type	Ferrite Core	Length	Serial No
USB Cable	Un-shielding	No	0.8m	N/A

Annex C.ii. EUT OPERATING CONKITIONS

N/A

Annex D. User Manual / Block Diagram / Schematics / Partlist

Please see the attachment

Annex E. DECLARATION OF SIMILARITY

N/A