TEST REPORT

Product Name:	Module
Trade Mark:	CINTERION
Model No. / HVIN:	PLS63-W
Report Number:	200722016RFM-1
Test Standards:	FCC 47 CFR Part 22 Subpart H FCC 47 CFR Part 24 Subpart E FCC 47 CFR Part 27 Subpart L RSS-132 Issue 3, RSS-133 Issue 6 RSS-139 Issue 3, RSS-Gen Issue 5
FCC ID:	QIPPLS63-W
IC:	7830A-PLS63W
Test Result:	PASS
Date of Issue:	February 3, 2021

Prepared for:

Thales DIS AIS Deutschland GmbH
Siemensdamm 50, 13629 Berlin, Germany

Prepared by:

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Date: February 3, 2021

Version

Version No.	Date	Description
V1.0	February 3, 2021	Original

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1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	Thales DIS AIS Deutschland GmbH
Address of Applicant:	Siemensdamm 50, 13629 Berlin, Germany
Manufacturer:	Thales DIS AIS Deutschland GmbH
Address of Manufacturer:	Werinherstr. 81, 81541 Munich, Germany

1.2 EUT INFORMATION

1.2.1 General Description of EUT

Product Name:	Module	
Model No.:	PLS63-W	
Trade Mark:	CINTERION	
DUT Stage:	Production Unit	
EUT Supports Function:	GSM Bands:	GSM850/ 1900
	UTRA Bands:	Band II/ Band IV/ Band V
	E-UTRA Bands:	FDD Band 2/ Band 4/ Band 5/ Band 7/ Band 12/ Band 13/ Band 26/ Band 66
		TDD Band 38/ Band 41
Original Sample Received Date:	July 24, 2020	
Original Sample Tested Date:	August 2, 2020 to August 21, 2020	
Sample Received Date:	December 3, 2020	
Sample Tested Date:	December 11, 2020 to December 12, 2020	
EUT identification	200722014-A01/2	
Firmware number	MDM9607.TX.1.0-00097-STD.PROD-1.366947.1.367976.1	

1.2.2 Description of Accessories

None.

1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

Support Networks:	GSM, GPRS ,EDGE, WCDMA, HSDPA, HSUPA, DC-HSDPA	
Type of Modulation:	GSM/GPRS:	GMSK
	EDGE:	GMSK, 8PSK
	WCDMA	BPSK
	HSDPA/DC-HSDPA:	QPSK
	HSUPA:	QPSK
Frequency Range:	GSM/GPRS/EDGE 850:	824.2-848.8 MHz
	GSM/GPRS/EDGE 1900:	1850.2-1909.8 MHz
	WCDMA Band II:	1852.4-1907.6 MHz
	WCDMA Band IV:	1712.4-1752.6 MHz
	WCDMA Band V:	826.4-846.6 MHz
Max RF Output Power:	GSM/GPRS 850:	33.57dBm
	EDGE 850:	27.59dBm
	GSM/GPRS 1900:	30.75dBm
	EDGE 1900:	26.37dBm

	WCDMA Band II:	24.52dBm
	WCDMA Band IV:	24.15dBm
	WCDMA Band V:	24.53dBm
Emission Designator:	GSM/GPRS 850:	245KGXW
	EDGE 850:	243KG7W
	GSM/GPRS 1900:	244KGXW
	EDGE 1900:	246KG7W
	WCDMA Band II:	4M14F9W
	WCDMA Band IV:	4M14F9W
	WCDMA Band V:	4M15F9W
Antenna Type:	External Antenna	
Antenna Gain:	GSM 850:	50 ohm terminal (0dBi)
	PCS 1900:	50 ohm terminal (0dBi)
	WCDMA Band II:	50 ohm terminal (0dBi)
	WCDMA Band IV:	50 ohm terminal (0dBi)
	WCDMA Band V:	50 ohm terminal (0dBi)
GPRS/EDGE Class:	Class 12	
Normal Test Voltage:	3.8 Vdc	
Extreme Test Voltage:	3.2 to 4.5 Vdc	
Extreme Test Temperature:	-30 °C to +65 °C	

1.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested with associated equipment below.

1) Support Equipment

Description	Manufacturer	Model No.	Serial Number	Supplied by
Adaptor	N/A	CD139	20359	Applicant
PCB board	N/A	DSB75	--	Applicant
PCB board	N/A	AH8	--	Applicant
50 ohm terminal	N/A	N/A	N/A	UnionTrust

2) Support Cable

Cable No.	Description	Connector	Length	Supplied by
--	--	--	--	--

1.5 TEST LOCATION

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: Unit D/E of 9/F and 16/F, Block A, Building 6, Baoneng science and technology park, Longhua district, Shenzhen, China 518109
Telephone: +86 (0) 755 2823 0888
Fax: +86 (0) 755 2823 0886

1.6 TEST FACILITY

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L9069
The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC/EN 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

A2LA-Lab Certificate No.: 4312.01
Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

ISED Wireless Device Testing Laboratories
CAB identifier: CN0032

FCC Accredited Lab.
Designation Number: CN1194
Test Firm Registration Number: 259480

1.7 DEVIATION FROM STANDARDS

None.

1.8 ABNORMALITIES FROM STANDARD CONDITIONS

None.

1.9 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

1.10 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

No.	Item	Measurement Uncertainty
1	Conducted emission 9KHz-150KHz	±3.2 dB
2	Conducted emission 150KHz-30MHz	±2.7 dB
3	Radiated spurious emissions 30MHz-1GHz	± 4.9 dB
4	Radiated spurious emissions 1GHz-18GHz	± 4.8 dB
5	Radiated spurious emissions 18GHz-40GHz	± 5.1 dB
6	Occupied Bandwidth	± 1.86 %
7	DC Supply Voltages	± 0.68 %
8	Temperature	± 0.62 °C
9	Humidity	± 3.9 %
10	Conducted spurious emissions	± 2.7 dB
11	DC Supply Voltages	± 0.68 %
12	AC Supply Voltages	± 1.2 %
13	Radio Frequency	± 6.5 x 10^{-8}
14	RF Power, Conducted	± 0.9 dB

2. TEST SUMMARY

FCC 47 CFR Part 22 Subpart H Test Cases			
Test Item	**Test Requirement**	**Test Method**	**Result**
Effective Radiated Power (ERP)	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 22.913(a) RSS-132 Issue 3, Section 5.4	ANSI C63.26-2015 & KDB 971168 D01v03r01	See Note
Conducted Output Power	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 22.913(a) RSS-132 Issue 3, Section 5.4	ANSI C63.26-2015 & KDB 971168 D01v03r01	See Note
Peak-to-average ratio	FCC 47 CFR Part 22.913(a) RSS-132 Issue 3, Section 5.4	ANSI C63.26-2015 & KDB 971168 D01v03r01	See Note
99%&26dB Bandwidth	FCC 47 CFR Part 2.1049(h) RSS-Gen Issue 5, Section 6.7	ANSI C63.26-2015 & KDB 971168 D01v03r01	See Note
Band Edge at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 22.917(a) RSS-132 Issue 3, Section 5.5	ANSI C63.26-2015 & KDB 971168 D01v03r01	See Note
Spurious emissions at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 22.917(a)(b) RSS-132 Issue 3, Section 5.5	ANSI C63.26-2015 & KDB 971168 D01v03r01	See Note
Field strength of spurious radiation	FCC 47 CFR Part 2.1053 & FCC 47 CFR Part 22.917(a)(b) RSS-132 Issue 3, Section 5.5	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Frequency stability	FCC 47 CFR Part 2.1055 & FCC 47 CFR Part 22.355 RSS-132 Issue 3, Section 5.3	ANSI C63.26-2015 & KDB 971168 D01v03r01	See Note

FCC 47 CFR Part 24 Subpart E Test Cases			
Test Item	**Test Requirement**	**Test Method**	**Result**
Equivalent Isotropic Radiated Power (EIRP)	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 24.232(c) RSS-133 Issue 6, Section 6.4	ANSI C63.26-2015 & KDB 971168 D01v03r01	See Note
Conducted Output Power	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 24.232(c) RSS-133 Issue 6, Section 6.4	ANSI C63.26-2015 & KDB 971168 D01v03r01	See Note
Peak-to-average ratio	FCC 47 CFR Part 24.232(d) RSS-133 Issue 6, Section 6.4	KDB 971168 D01v03r01	See Note
99%&26dB Bandwidth	FCC 47 CFR Part 2.1049(h) & FCC 47 CFR Part 24.238(b) RSS-Gen Issue 5, Section 6.7	ANSI C63.26-2015 & KDB 971168 D01v03r01	See Note
Band Edge at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 24.238(a) RSS-133 Issue 6, Section 6.5	ANSI C63.26-2015 & KDB 971168 D01v03r01	See Note
Spurious emissions at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 24.238(a)(b) RSS-133 Issue 6, Section 6.5	ANSI C63.26-2015 & KDB 971168 D01v03r01	See Note
Field strength of spurious radiation	FCC 47 CFR Part 2.1053 & FCC 47 CFR Part 24.238(a)(b) RSS-133 Issue 6, Section 6.5	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Frequency stability	FCC 47 CFR Part 2.1055 & FCC 47 CFR Part 24.235 RSS-133 Issue 6, Section 6.3	ANSI C63.26-2015 & KDB 971168 D01v03r01	See Note

FCC 47 CFR Part 27 Subpart L Test Cases			
Test Item	**Test Requirement**	**Test Method**	**Result**
Equivalent Isotropic Radiated Power (EIRP)	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 27.50(d)(4) RSS-139 Issue 3, Section 6.5	ANSI C63.26-2015 & KDB 971168 D01v03r01	See Note
Conducted Output Power	FCC 47 CFR Part 2.1046(a) & FCC 47 CFR Part 27.50(d)(4) RSS-139 Issue 3, Section 6.5	ANSI C63.26-2015 & KDB 971168 D01v03r01	See Note
Peak-to-average ratio	FCC 47 CFR Part 27.50(d)(5) RSS-139 Issue 3, Section 6.5	KDB 971168 D01v03r01	See Note
99%&26dB Bandwidth	FCC 47 CFR Part 2.1049(h) FCC 47 CFR Part 27.53(h) RSS-Gen Issue 5, Section 6.7	ANSI C63.26-2015 & KDB 971168 D01v03r01	See Note
Band Edge at antenna terminals	FCC 47 CFR Part 27.53(h)(1) RSS-139 Issue 3, Section 6.6	ANSI C63.26-2015 & KDB 971168 D01v03r01	See Note
Spurious emissions at antenna terminals	FCC 47 CFR Part 2.1051 & FCC 47 CFR Part 27.53(h) RSS-139 Issue 3, Section 6.6	ANSI C63.26-2015 & KDB 971168 D01v03r01	See Note
Field strength of spurious radiation	FCC 47 CFR Part 2.1053 & FCC 47 CFR Part 27.53(h) RSS-139 Issue 3, Section 6.6	ANSI C63.26-2015 & KDB 971168 D01v03r01	PASS
Frequency stability	FCC 47 CFR Part 2.1055 & FCC 47 CFR Part 27.54 RSS-139 Issue 3, Section 6.4	ANSI C63.26-2015 & KDB 971168 D01v03r01	See Note

Note:

Difference description:

1) There are hardware differences between PLS63-W and PLS83-W Module. For detailed PCB board and component differences, see the difference statement document

2) The HSPA Category level of PLS63-W is 1, different from PLS83-W Cat 4.

Test Plan:

1) According to the difference description, PLS63-W shares the same data from the PLS83-W original report (Report No.: 200722013RFM-1), and test the new data of the spurious radiation items.

3. EQUIPMENT LIST

Radiated Emission Test Equipment List						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date (mm dd, yyyy)**	**Cal. Due date (mm dd, yyyy)**
☒	3M Chamber & Accessory Equipment	ETS-LINDGREN	3M	N/A	Dec. 03, 2018	Dec. 03, 2021
☒	Receiver	R&S	ESIB26	100114	Nov. 24, 2019	Nov. 23, 2020
					Nov. 18, 2020	Nov. 17, 2021
☒	Broadband Antenna	ETS-LINDGREN	3142E	00201566	Nov. 16, 2019	Nov. 15, 2020
					Nov. 14, 2020	Nov. 13, 2021
☒	6dB Attenuator	Talent	RA6A5-N-18	18103001	Nov. 16, 2019	Nov. 15, 2020
					Nov. 14, 2020	Nov. 13, 2021
☒	Preamplifier	HP	8447F	2805A02960	Nov. 16, 2019	Nov. 15, 2020
					Nov. 10, 2020	Nov. 9, 2021
☒	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201874	Nov. 16, 2019	Nov. 15, 2020
					May 30, 2020	May 29, 2021
☒	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3116C-PA	00202652	Nov. 16, 2019	Nov. 15, 2020
					Nov. 14, 2020	Nov. 13, 2021
☒	Multi device Controller	ETS-LINDGREN	7006-001	00160105	N/A	N/A
☒	Test Software	Audix	e3	Software Version: 9.160323		

RF Test Equipment List						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date (mm dd, yyyy)**	**Cal. Due date (mm dd, yyyy)**
☒	Receiver	R&S	ESR7	1316.3003K07 -101181-K3	Nov. 24, 2019	Nov. 23, 2020
☒	EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY51440197	Nov. 24, 2019	Nov. 23, 2020
☒	Wideband Radio Communication Tester	R&S	CMW500	120932	Jul.20, 2020	Jul.19, 2021
☐	Wideband Radio Communication Tester	R&S	CMW500	119583	Jul.20, 2020	Jul.19, 2021
☐	Universal Radio Communication Tester	R&S	CMU200	114713	Nov. 24, 2019	Nov. 23, 2020
☒	DC Source	KIKUSUI	PWR400L	LK003024	Sep. 09, 2019	Sep. 08, 2020
☐	Temp & Humidity chamber	Espec	GL(U)04K A(W)	16921H201P3	Sep. 09, 2019	Sep. 08, 2020
☒	Temp & Humidity chamber	Votisch	VT4002	58566133290 020	May.11, 2020	May.10, 2021

4. TEST CONFIGURATION

4.1 ENVIRONMENTAL CONDITIONS FOR TESTING

Test Environment	Selected Values During Tests		
Test Condition	Ambient		
	Temperature (°C)	Voltage (V)	Relative Humidity (%)
TN/VN	+15 to +35	3.8	20 to 75
TL/VL	-30	3.2	20 to 75
TH/VL	+65	3.2	20 to 75
TL/VH	-30	4.5	20 to 75
TH/VH	+65	4.5	20 to 75

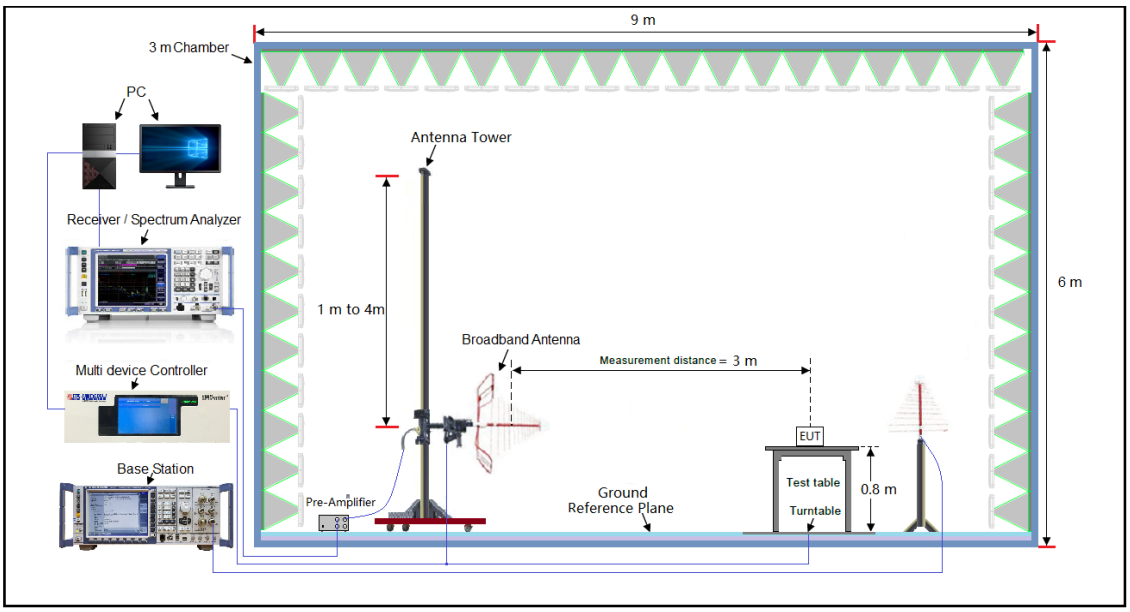
Remark:

1) The EUT just work in such extreme temperature of -30 °C to +65 °C and the extreme voltage of 3.2 V to 4.5 V, so here the EUT is tested in the temperature of -30 °C to +65 °C and the voltage of 3.2 V to 4.5V.
2) VN: Normal Voltage; TN: Normal Temperature;
   TL: Low Extreme Test Temperature; TH: High Extreme Test Temperature;
   VL: Low Extreme Test Voltage; VH: High Extreme Test Voltage.

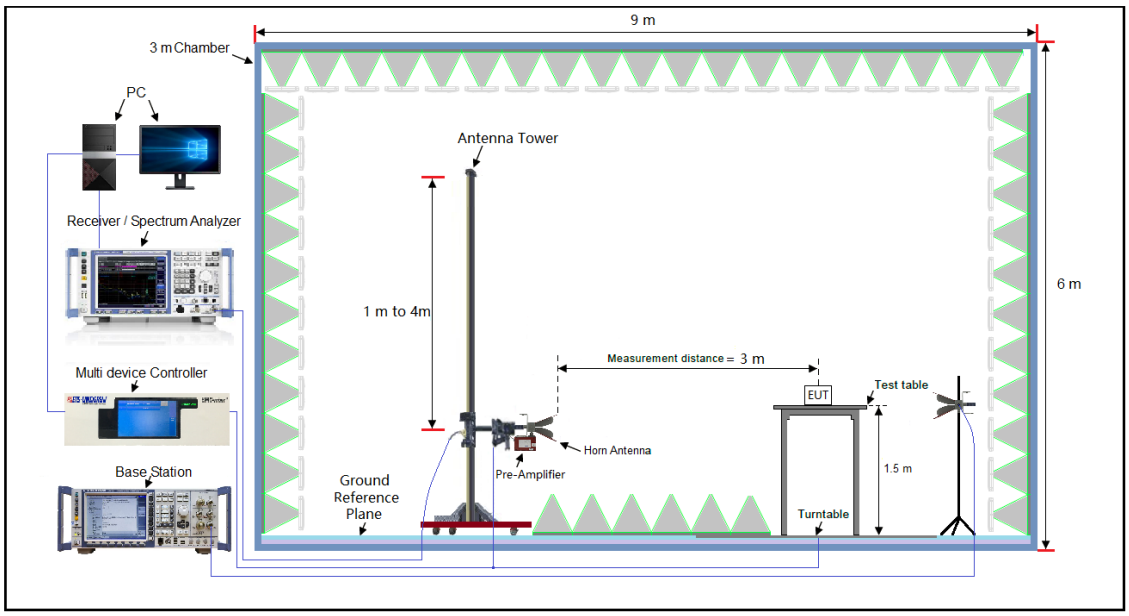
4.2 TEST SETUP

4.2.1 For Radiated Emissions test setup

Radiated Emissions 30MHz to 1GHz Test setup

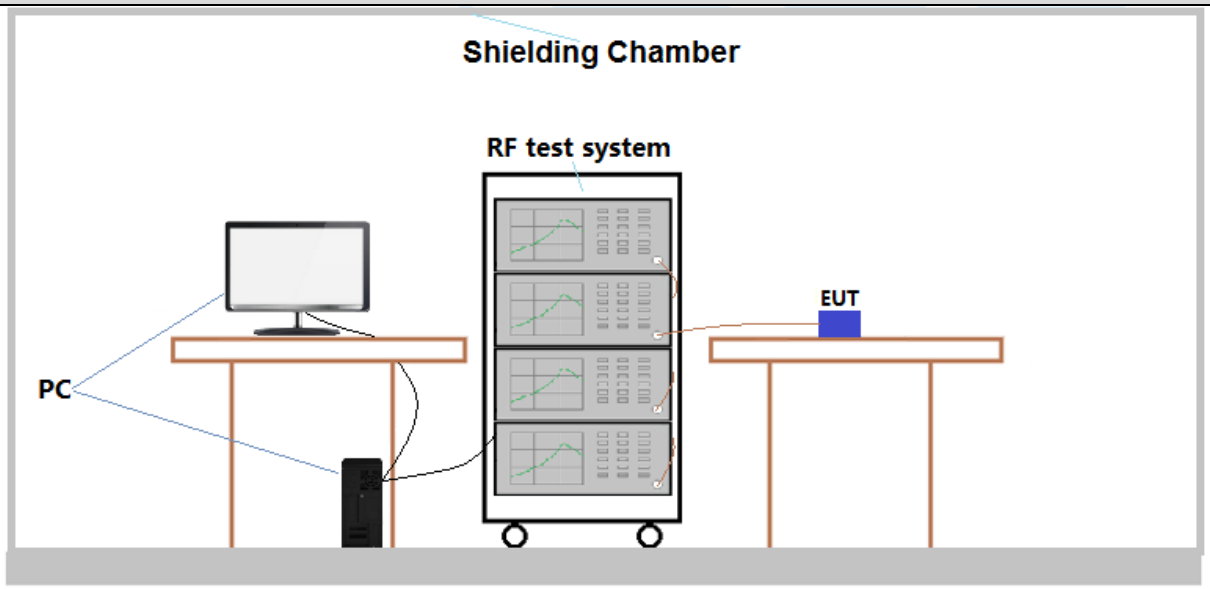


Radiated Emissions Above 1GHz Test setup

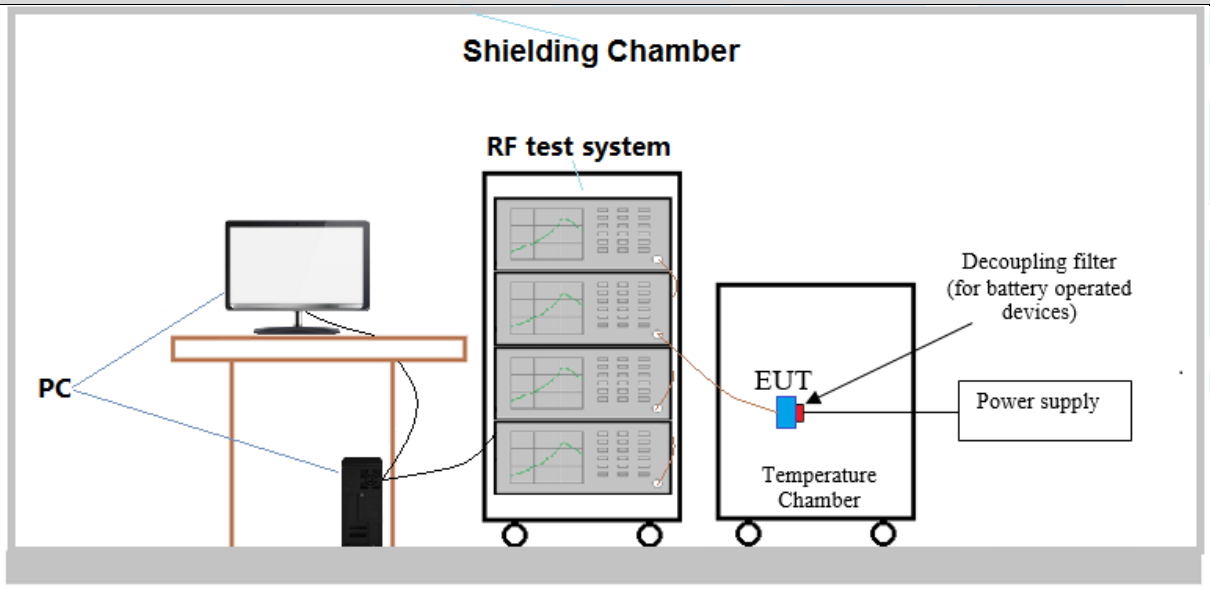


4.2.2 For Conducted RF test setup

Normal Environment



Extreme Environment



4.3 TEST CHANNELS

Bands	Tx/Rx Frequency	RF Channel		
		Low(L)	Middle(M)	High(H)
GSM/GPRS/ EDGE850	Tx (824 MHz ~ 849 MHz)	Channel 128	Channel 190	Channel 251
		824.2 MHz	836.6 MHz	848.8 MHz
WCDMA band V	Tx (824 MHz ~ 849 MHz)	Channel 4132	Channel 4182	Channel 4233
		826.4 MHz	836.4 MHz	846.6 MHz

Bands	Tx/Rx Frequency	RF Channel		
		Low(L)	Middle(M)	High(H)
GSM/GPRS/ EDGE1900	Tx (1850 MHz-1910 MHz)	Channel 512	Channel 661	Channel 810
		1850.2 MHz	1880.0 MHz	1909.8 MHz
WCDMA Band II	Tx (1850 MHz-1910 MHz)	Channel 9262	Channel 9400	Channel 9538
		1852.4 MHz	1880.0 MHz	1907.6 MHz

Bands	Tx/Rx Frequency	RF Channel		
		Low(L)	Middle(M)	High(H)
WCDMA Band IV	Tx (1710 MHz-1755 MHz)	Channel 1312	Channel 1412	Channel 1513
		1712.4 MHz	1732.4 MHz	1752.6 MHz

4.4 SYSTEM TEST CONFIGURATION

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, radiated emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario. Only the worst case data were recorded in this test report.

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, X/Y/Z axis, and antenna ports.
The worst case was found when positioned as the table below.

Bands	Mode	Antenna Port	Worst-case axis positioning
GSM 850	1TX	Chain 0	Z axis
PCS 1900	1TX	Chain 0	Z axis
WCDMA Band II	1TX	Chain 0	Z axis
WCDMA Band IV	1TX	Chain 0	Z axis
WCDMA Band V	1TX	Chain 0	Z axis

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000MHz. The resolution is 1 MHz or greater for frequencies above 1000MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

4.5 PRE-SCAN

Pre-scan under all rate at lowest middle and highest channel, find the transmitter power as below:
SIM 1 Card Conducted transmitter power measurement result.

GSM 850 Maximum Average Power (dBm)			
Channel	**128**	**190**	**251**
Frequency(MHz)	**824.2 MHz**	**836.6 MHz**	**848.8 MHz**
GSM (GMSK, 1Tx-slot)	33.42	33.56	33.40
GPRS (GMSK, 1Tx-slot)	33.47	33.40	**33.57**
GPRS (GMSK, 2Tx-slot)	30.65	30.58	30.72
GPRS (GMSK, 3Tx-slot)	28.36	28.63	28.67
GPRS (GMSK, 4Tx-slot)	26.84	27.19	27.25
EDGE (8PSK, 1Tx-slot)	27.44	27.58	27.59
EDGE (8PSK, 2Tx-slot)	24.30	24.41	24.41
EDGE (8PSK, 3Tx-slot)	22.32	22.40	22.52
EDGE (8PSK, 4Tx-slot)	20.90	21.00	21.02

PCS 1900 Maximum Average Power (dBm)			
Channel	**512**	**661**	**810**
Frequency(MHz)	**1850.2 MHz**	**1880.0 MHz**	**1909.8 MHz**
GSM (GMSK, 1Tx-slot)	30.63	30.62	30.74
GPRS (GMSK, 1Tx-slot)	30.62	30.60	**30.75**
GPRS (GMSK, 2Tx-slot)	27.96	28.31	28.12
GPRS (GMSK, 3Tx-slot)	26.26	26.34	26.46
GPRS (GMSK, 4Tx-slot)	25.20	25.38	25.20
EDGE (8PSK, 1Tx-slot)	26.26	26.37	26.21
EDGE (8PSK, 2Tx-slot)	23.47	23.68	23.46
EDGE (8PSK, 3Tx-slot)	21.58	21.85	21.66
EDGE (8PSK, 4Tx-slot)	20.93	21.02	21.02

WCDMA Band II Maximum Average Power (dBm)			
Channel	**9262**	**9400**	**9538**
Frequency(MHz)	**1852.4 MHz**	**1880.0 MHz**	**1907.6 MHz**
AMR	23.26	23.57	23.35
RMC 12.2kbps	24.46	**24.52**	24.34
HSDPA Subtest-1	23.27	23.14	22.96
HSDPA Subtest-2	21.66	21.53	21.58
HSDPA Subtest-3	20.71	20.65	20.40
HSDPA Subtest-4	20.36	20.55	20.49
HSUPA Subtest-1	22.44	22.54	22.04
HSUPA Subtest-2	22.28	22.12	22.43
HSUPA Subtest-3	22.17	22.18	22.03
HSUPA Subtest-4	22.15	22.14	22.15
HSUPA Subtest-5	23.16	23.19	23.05
DC-HSDPA Subtest-1	22.76	23.04	22.96
DC-HSDPA Subtest-2	21.46	21.18	21.54
DC-HSDPA Subtest-3	20.15	20.65	20.49
DC-HSDPA Subtest-4	20.16	20.35	20.44

WCDMA Band IV Maximum Average Power (dBm)			
Channel	**1312**	**1412**	**1513**
Frequency(MHz)	**1712.4 MHz**	**1732.4 MHz**	**1752.6 MHz**
AMR	23.14	23.06	23.24
RMC 12.2kbps	24.06	**24.15**	23.94
HSDPA Subtest-1	23.15	23.02	23.08
HSDPA Subtest-2	21.25	21.23	21.17
HSDPA Subtest-3	19.95	19.89	19.87
HSDPA Subtest-4	19.89	19.93	19.83
HSUPA Subtest-1	22.96	22.93	22.88
HSUPA Subtest-2	22.49	22.57	22.70
HSUPA Subtest-3	22.82	22.64	22.29
HSUPA Subtest-4	23.04	23.15	23.02
HSUPA Subtest-5	23.24	23.40	23.32
DC-HSDPA Subtest-1	22.85	22.89	22.93
DC-HSDPA Subtest-2	21.21	21.22	21.13
DC-HSDPA Subtest-3	19.53	19.33	19.37
DC-HSDPA Subtest-4	19.37	19.26	19.35

WCDMA Band V Maximum Average Power (dBm)			
Channel	**4132**	**4182**	**4233**
Frequency(MHz)	**826.4 MHz**	**836.4 MHz**	**846.6 MHz**
AMR	23.20	23.36	23.54
RMC 12.2kbps	24.38	24.39	**24.53**
HSDPA Subtest-1	22.56	22.60	22.76
HSDPA Subtest-2	22.07	22.11	22.01
HSDPA Subtest-3	20.29	20.32	20.31
HSDPA Subtest-4	20.13	20.25	20.33
HSUPA Subtest-1	22.70	22.93	22.94
HSUPA Subtest-2	22.49	22.85	22.37
HSUPA Subtest-3	22.09	22.14	22.47
HSUPA Subtest-4	22.21	22.29	22.32
HSUPA Subtest-5	23.15	23.16	23.35
DC-HSDPA Subtest-1	22.54	22.77	22.64
DC-HSDPA Subtest-2	21.32	21.33	21.55
DC-HSDPA Subtest-3	20.29	20.32	20.31
DC-HSDPA Subtest-4	20.13	20.25	20.33

Pre-scan all bandwidth and RB, find worse case mode are chosen to the report, the worse mode applicability and tested channel detail as below:

Band	Radiated	Conducted
GSM/GPRS/ EDGE 850/1900	1) GSM (GMSK, 1Tx-slot) Link 2) GPRS (GMSK, 1Tx-slot) Link 3) EDGE (8PSK, 1Tx-slot) Link	1) GSM (GMSK,1Tx-slot) Link 2) GPRS (GMSK, 1Tx-slot) Link 3) EDGE (8PSK, 1Tx-slot) Link
WCDMA Band II/IVV	RMC 12.2kbps Link	RMC 12.2kbps Link

5. RADIO TECHNICAL REQUIREMENTS SPECIFICATION

5.1 REFERENCE DOCUMENTS FOR TESTING

No.	Identity	Document Title
1	FCC 47 CFR Part 2	Frequency allocations and radio treaty matters; general rules and regulations
2	FCC 47 CFR Part 22	Public Mobile Services
3	FCC 47 CFR Part 27	Miscellaneous Wireless Communications Services
4	FCC 47 CFR Part 24	Personal Communications Services
5	RSS-Gen Issue 5	General Requirements for Compliance of Radio Apparatus
6	RSS-132 Issue 3	Cellular Telephone Systems Operating in the Bands 824-849 MHz and 869-894 MHz
7	RSS-133 Issue 6	2 GHz Personal Communications Services Aussi disponible
8	RSS-139 Issue 3	Advanced Wireless Services (AWS) Equipment Operating in the Bands 1710-1780 MHz and 2110-2180 MHz
9	ANSI C63.26-2015	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services
10	KDB 971168 D01	KDB 971168 D01 Power Meas License Digital Systems v03r01

5.2 MAXIMUM ERP/EIRP

Test Requirement: FCC 47 CFR Part 2.1046(a),
FCC 47 CFR Part 22.913(a),
FCC 47 CFR Part 24.232(c),
FCC 47 CFR Part 27.50(d)(4)
RSS-132 Issue 3, Section 5.4,
RSS-133 Issue 6, Section 6.4,
RSS-139 Issue 3, Section 6.5

Test Method: KDB 971168 D01v03r01 Section 5.6 & ANSI C63.26-2015

Limit:

FCC 47 CFR Part 22.913(a)
The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

FCC 47 CFR Part 24.232(c)
Mobile and portable stations are limited to 2 watts EIRP.

FCC 47 CFR Part 27.50(d)(4)
Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

RSS-132 Issue 3, Section 5.4,
The transmitter output power shall be measured in terms of average power. The equivalent isotropically radiated power (e.i.r.p.) for mobile equipment shall not exceed 11.5 watts.

RSS-133 Issue 6, Section 6.4
The equivalent isotropically radiated power (e.i.r.p.) for transmitters shall not exceed the limits given in SRSP-510. Moreover, base station transmitters operating in the band 1930-1995 MHz shall not have output power exceeding 100 watts.

RSS-139 Issue 3, Section 6.5
The equivalent isotropically radiated power (e.i.r.p.) for mobile and portable transmitters shall not exceed one watt. The e.i.r.p. for fixed and base stations in the band 1710-1780 MHz shall not exceed one watt.

Test Procedure:

$$\text{ERP or EIRP} = P_{Meas} + G_T - L_C$$

where:
ERP or EIRP = effective radiated power or equivalent isotropically radiated power, respectively

(expressed in the same units as PMeas, typically dBW or dBm);
P_{Meas} = measured transmitter output power or PSD, in dBm or dBW;
G_T = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);
L_C = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

Test Setup: Refer to section 4.2.1 for details.
Instruments Used: Refer to section 3 for details
Test Mode: Link mode
Test Results: Pass
Test Data: See table below

Bands	Modulation	Max. Conducted Avg. Power	Ant. Gain	Limit	ERP		Result
		(dBm)	(dBi)	(W)	(dBm)	(W)	
GSM 850 (824-849 MHz)	GPRS	33.57	0.00	7.0	31.42	1.386756	Pass
	EDGE(8PSK)	27.59	0.00		25.44	0.349945	Pass
WCDMA Band V (824-849 MHz)	RMC 12.2kbps	24.53	0.00	7.0	22.38	0.172982	Pass
	HSUPA	23.35	0.00		21.20	0.131826	Pass
	HSDPA	22.76	0.00		20.61	0.115080	Pass

Bands	Modulation	Max. Conducted Avg. Power	Ant. Gain	Limit	EIRP		Result
		(dBm)	(dBi)	(W)	(dBm)	(W)	
PCS 1900 (1850-1910 MHz)	GPRS	30.75	0.00	2.0	30.75	1.188502	Pass
	EDGE(8PSK)	26.37	0.00		26.37	0.433511	Pass
WCDMA Band II (1850-1910 MHz)	RMC 12.2kbps	24.52	0.00	2.0	24.52	0.283139	Pass
	HSUPA	23.19	0.00		23.19	0.208449	Pass
	HSDPA	23.27	0.00		23.27	0.212324	Pass
WCDMA Band IV (1710-1755 MHz)	RMC 12.2kbps	24.15	0.00	1.0	24.15	0.260016	Pass
	HSUPA	23.40	0.00		23.40	0.218776	Pass
	HSDPA	23.15	0.00		23.15	0.206538	Pass

5.3 CONDUCTED OUTPUT POWER

Test Requirement: FCC 47 CFR Part 2.1046(a),
FCC 47 CFR Part 22.913(a),
FCC 47 CFR Part 24.232(c),
FCC 47 CFR Part 27.50(d)(4),
RSS-132 Issue 3, Section 5.4,
RSS-133 Issue 6, Section 6.4,
RSS-139 Issue 3, Section 6.5

Test Method: KDB 971168 D01v03r01 & ANSI C63.26-2015

Limit:

FCC 47 CFR Part 22.913(a)
The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

FCC 47 CFR Part 24.232(c)
Mobile and portable stations are limited to 2 watts EIRP.

FCC 47 CFR Part 27.50(d)(4)
Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

RSS-132 Issue 3, Section 5.4,
The transmitter output power shall be measured in terms of average power. The equivalent isotropically radiated power (e.i.r.p.) for mobile equipment shall not exceed 11.5 watts.

RSS-133 Issue 6, Section 6.4
The equivalent isotropically radiated power (e.i.r.p.) for transmitters shall not exceed the limits given in SRSP-510. Moreover, base station transmitters operating in the band 1930-1995 MHz shall not have output power exceeding 100 watts.

RSS-139 Issue 3, Section 6.5
The equivalent isotropically radiated power (e.i.r.p.) for mobile and portable transmitters shall not exceed one watt. The e.i.r.p. for fixed and base stations in the band 1710-1780 MHz shall not exceed one watt.

Test Procedure:
The EUT was set up for the maximum power with GSM, GPRS, EDGE, WCDMA, CDMA2000, and LTE link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup: Refer to section 4.2.2 for details.

Instruments Used: Refer to section 3 for details

Test Mode: Link mode

Test Results: Pass

Test Data: The full result refer to section 4.5 for details.

5.4 PEAK-TO-AVERAGE RATIO

Test Requirement: FCC 47 CFR Part 22.913(a), FCC 47 CFR Part 24.232(c), FCC 47 CFR Part 27.50(d)(5) RSS-132 Issue 3, Section 5.4, RSS-133 Issue 6, Section 6.4, RSS-139 Issue 3, Section 6.5

Test Method: KDB 971168 D01v03r01 Section 5.7

Limit: In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB

Test Procedure:

The EUT was connected to Spectrum Analyzer and Base Station via power divider. 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.

Some regulatory requirements specify a PAPR limit when the output power limits are specified in terms of average power. If it becomes necessary to provide measurement data to demonstrate compliance to a PAPR limit, then the appropriate procedure from those provided in 5.2.3 shall be utilized to determine the peak power (or peak PSD) and the appropriate procedure from those provided in 5.2.4 shall be used to determine the average power (or average PSD). The data from these measurements is then used in Equation (2) to determine the PAPR of a narrowband CW-like signal. See 5.2.3.4 for guidance on determining the PAPR of a broadband noise-like signal.

PAPR (dB) = PPk (dBm or dBW)-PAvg (dBm or dBW)

where:

PAPR peak-to-average power ratio, in dB;

PPk measured peak power or peak PSD level, in dBm or dBW;

PAvg measured average power or average PSD level, in dBm or dBW.

OR

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer.

a) Set resolution/measurement bandwidth ≥ signal's occupied bandwidth
b) Set the number of counts to a value that stabilizes the measured CCDF curve
c) Record the maximum PAPR level associated with a probability of 0.1 %

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup: Refer to section 4.2.2 for details.

Instruments Used: Refer to section 3 for details

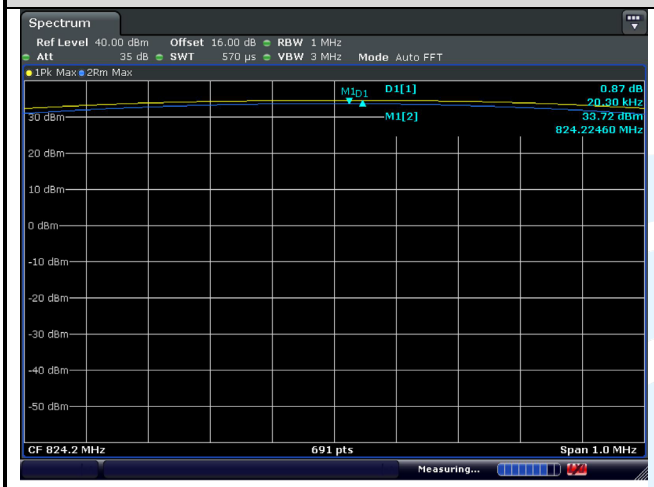
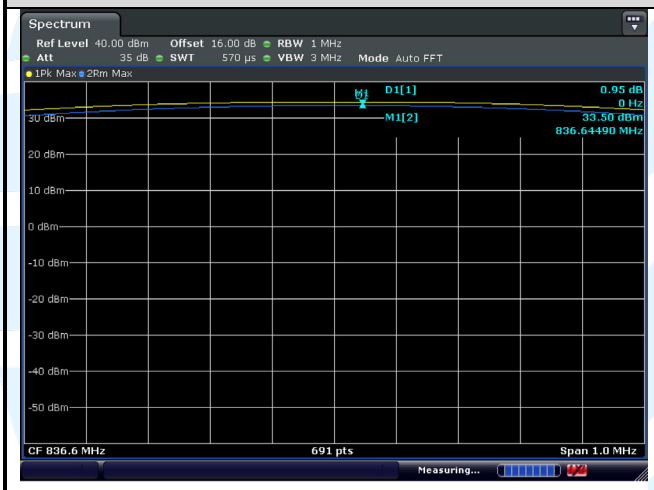
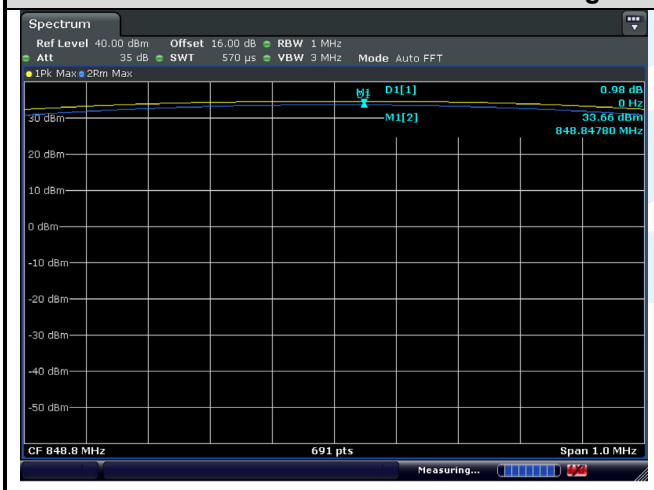
Test Mode: Link mode

Test Results: Pass

Test Data: See table below

Bands	Modulation	Peak-to-average ratio (dB)			Limit	Result
		Lowest	Middle	Highest	(dB)	
GSM 850	GSM	0.87	0.95	0.98	13	Pass
	EDGE	0.82	0.82	0.89	13	Pass
PCS 1900	GSM	0.57	0.55	0.57	13	Pass
	EDGE	0.46	0.47	0.49	13	Pass
WCDMA Band II	RMC 12.2kbps	3.16	3.28	3.36	13	Pass
WCDMA Band IV	RMC 12.2kbps	3.04	2.90	3.10	13	Pass
WCDMA Band V	RMC 12.2kbps	3.51	3.19	3.45	13	Pass

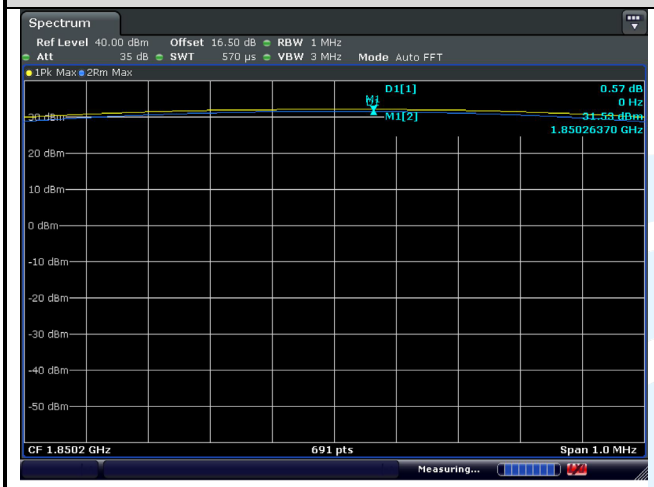
The test plots as follows:

GSM 850	
GSM	EDGE
Lowest Channel	
	
Middle Channel	
	
Highest Channel	
	

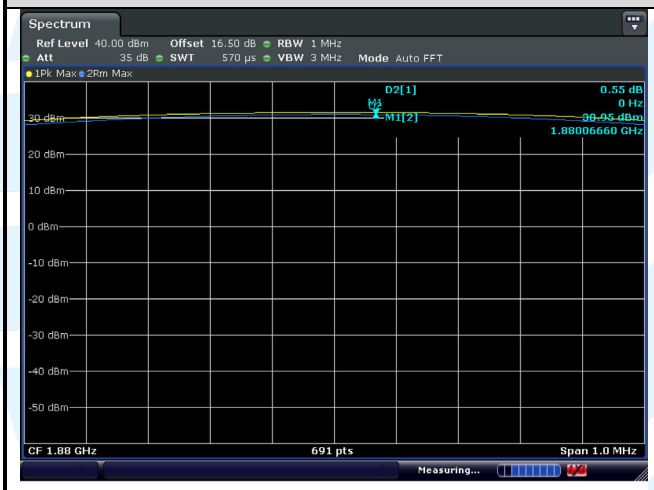
PCS 1900

GSM	EDGE

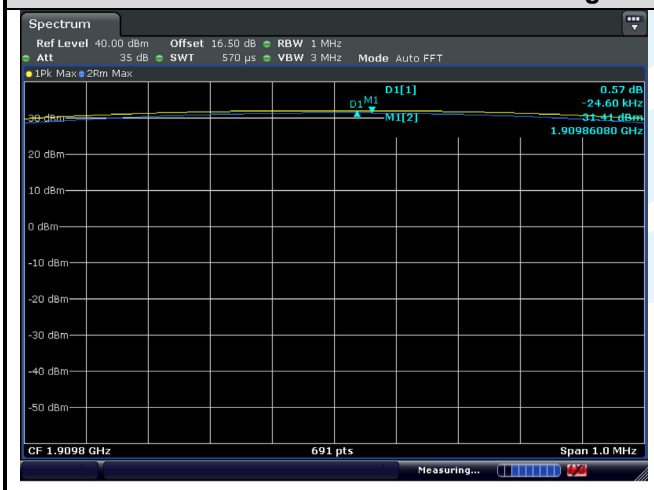
Lowest Channel



Middle Channel



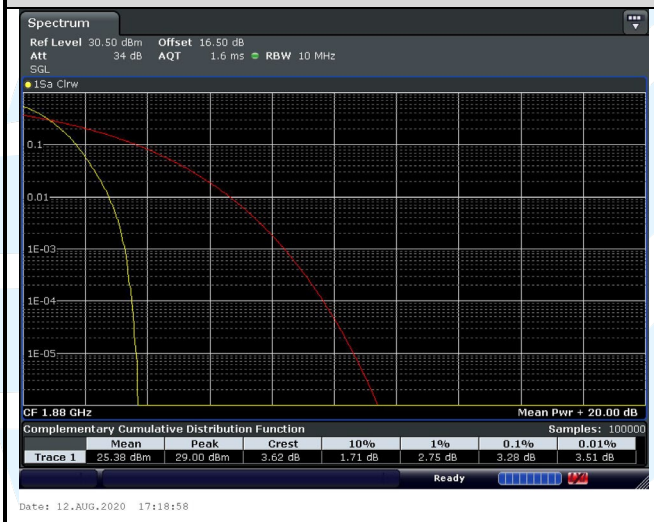
Highest Channel



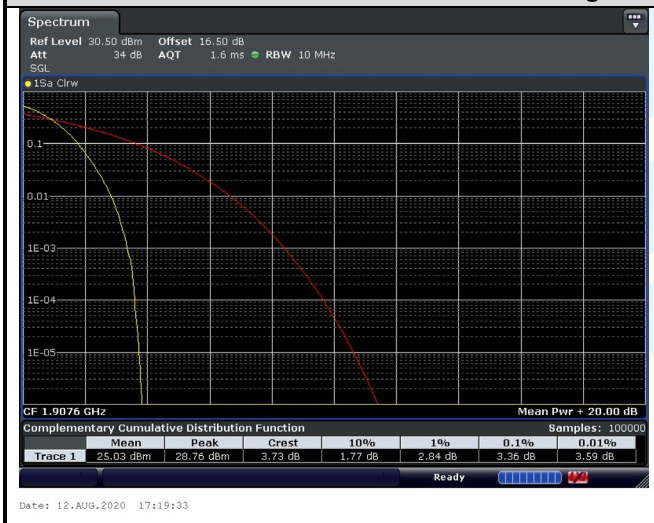
WCDMA Band II_RMC 12.2kbps	WCDMA Band IV_RMC 12.2kbps

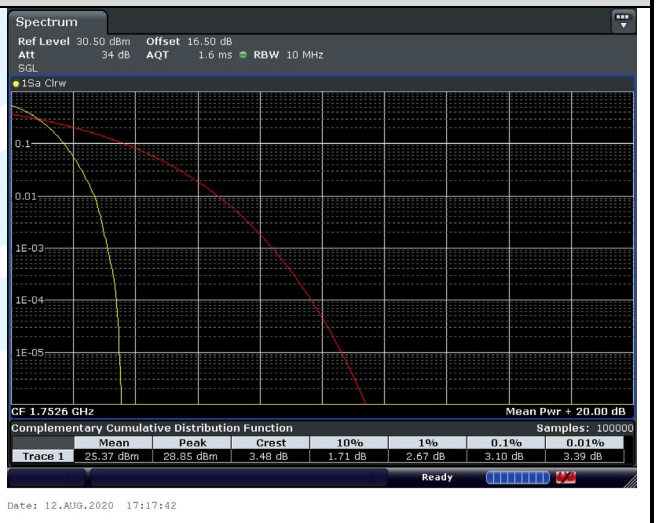
Lowest Channel

Middle Channel



Highest Channel

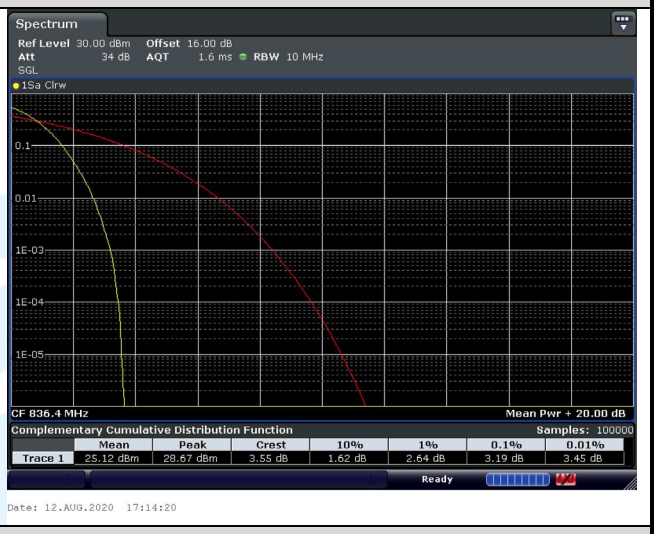




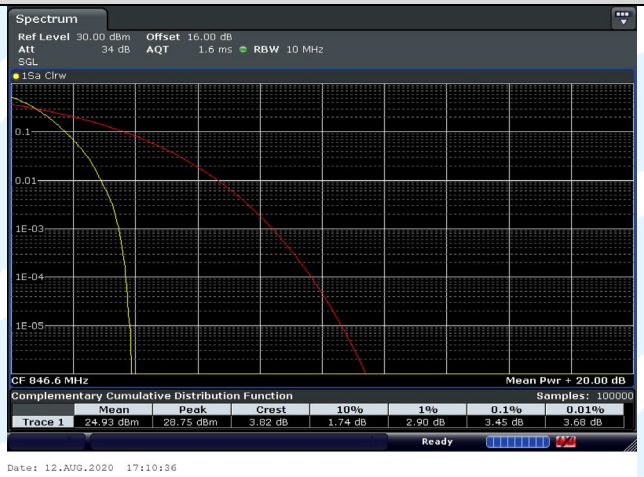
WCDMA Band V_RMC 12.2kbps

Lowest Channel

Middle Channel



Highest Channel



5.599%&26DB BANDWIDTH

Test Requirement: FCC 47 CFR Part 2.1049(h),
FCC 47 CFR Part 22.917(b),
FCC 47 CFR Part 24.238(b),
FCC 47 CFR Part 27.53(h)
RSS-Gen Issue 5, Section 6.7

Test Method: ANSI C63.26-2015 & KDB 971168 D01v03r01 Section 4

Limit: No Limit, for reporting purposes only.

Test Procedure:

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the low, middle and high channel in each band. The 99% and -26dB bandwidths was also measured and recorded.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup: Refer to section 4.2.2 for details.

Instruments Used: Refer to section 3 for details

Test Mode: Link mode

Test Results: Pass

Test Data: See table below

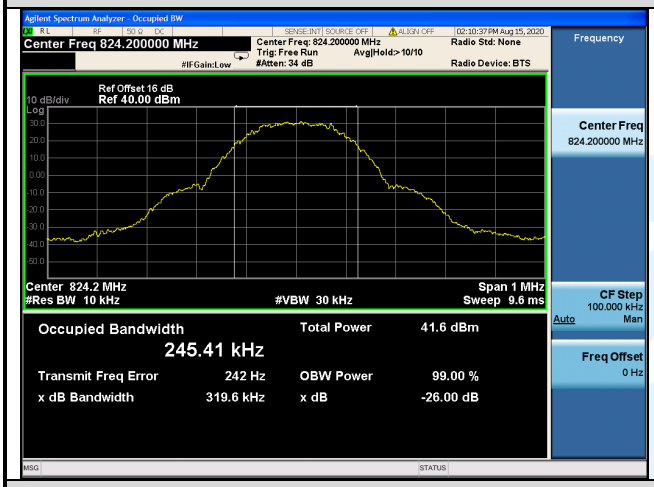
Bands	Modulation	Channel	Frequency (MHz)	26 dB BW (kHz)	99% BW (kHz)
GSM 850	GSM	128	824.2	319.6	245.41
		190	836.6	315.5	243.75
		251	848.8	317.1	243.10
	EDGE	128	824.2	315.8	243.65
		190	836.6	309.2	243.10
		251	848.8	315.8	243.02
PCS 1900	GSM	512	1850.2	321.4	244.02
		661	1880.0	313.9	243.78
		810	1909.8	318.2	247.05
	EDGE	512	1850.2	326.7	244.92
		661	1880.0	317.6	244.83
		810	1909.8	315.6	246.55
Bands	**Modulation**	**Channel**	**Frequency (MHz)**	**26 dB BW (MHz)**	**99% BW (MHz)**
WCDMA Band II	RMC 12.2kbps	9262	1852.4	4.718	4.1434
		9400	1880.0	4.714	4.1316
		9538	1907.6	4.706	4.1310
WCDMA Band IV	RMC 12.2kbps	1312	1712.4	4.737	4.1415
		1412	1732.4	4.729	4.1340
		1513	1752.6	4.725	4.1298
WCDMA Band V	RMC 12.2kbps	4132	826.4	4.723	4.1477
		4182	836.4	4.737	4.1367
		4233	846.6	4.679	4.0987

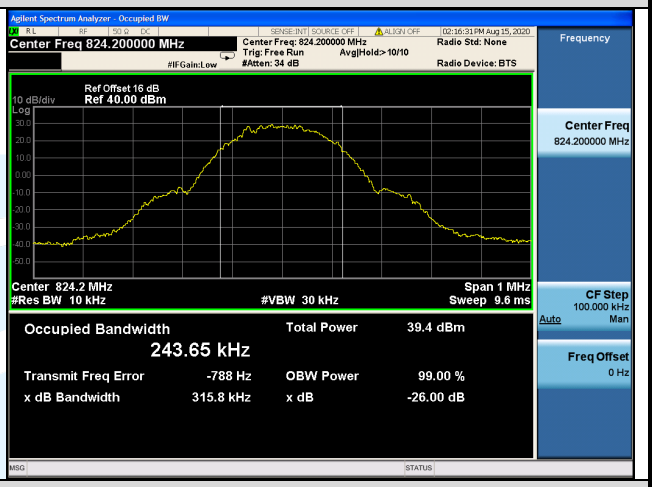
The test plots as follows:

GSM 850

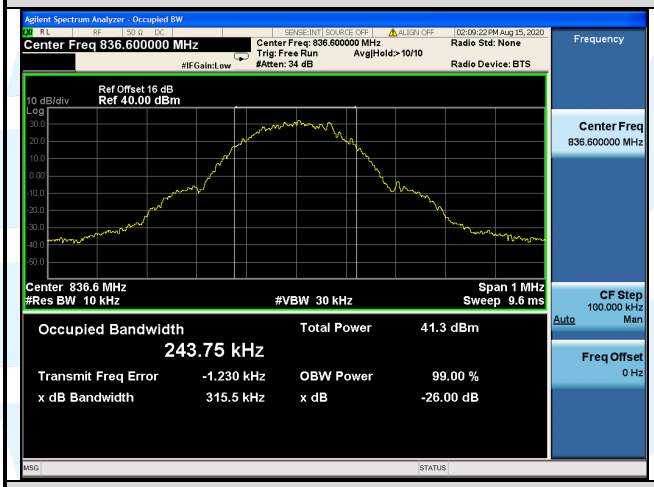
GSM	EDGE

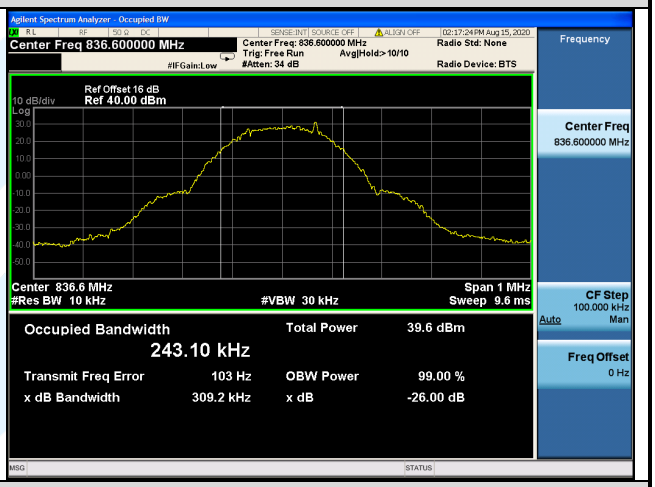
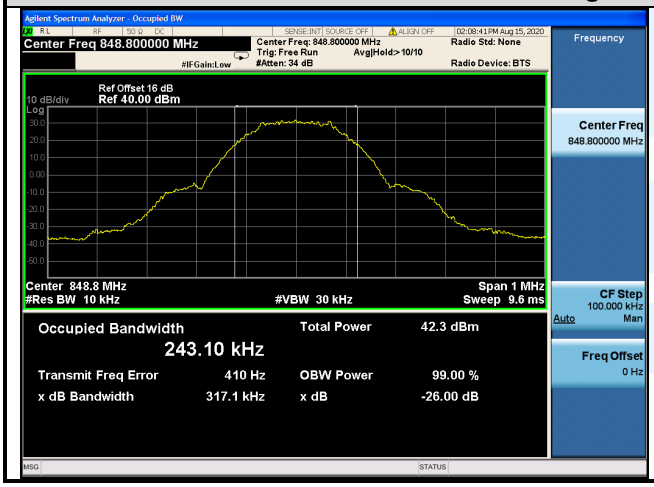
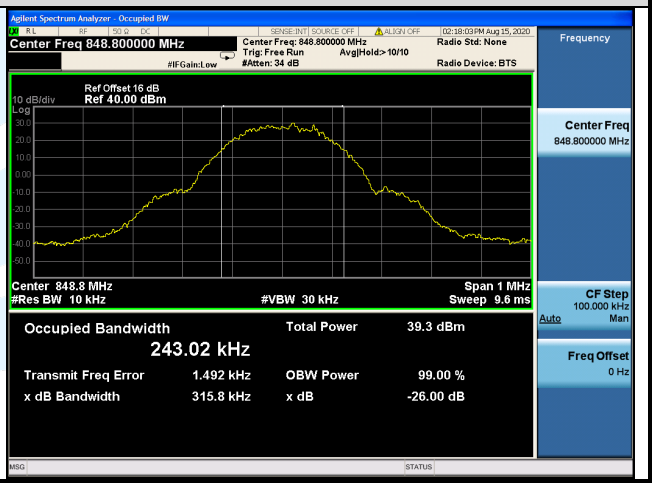
Lowest Channel





Middle Channel





Highest Channel