

RF TEST REPORT



Report No.: 16070657-FCC-R1

Supersede Report No.: N/A

Applicant	SMT TELECOMM HK LIMITED	
Product Name	Mobile Phone	
Model No.	X410	
Serial No.	N/A	
Test Standard	FCC Part 22(H):2014 ;FCC Part 24(E):2014; ANSI/TIA 603 D: 2010	
Test Date	November 24 to December 04, 2015&June 16, 2016	
Issue Date	June 17, 2016	
Test Result	☒ Pass ☐ Fail	
Equipment complied with the specification ☒		
Equipment did not comply with the specification ☐		
<i>Winnie Zhang</i>	<i>David Huang</i>	
Winnie Zhang Test Engineer	David Huang Checked By	
This test report may be reproduced in full only Test result presented in this test report is applicable to the tested sample only		

Issued by:

SIEMIC (SHENZHEN-CHINA) LABORATORIES

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Laboratories Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.



In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

Accreditations for Conformity Assessment

Country/Region	Scope
USA	EMC, RF/Wireless, SAR, Telecom
Canada	EMC, RF/Wireless, SAR, Telecom
Taiwan	EMC, RF, Telecom, SAR, Safety
Hong Kong	RF/Wireless, SAR, Telecom
Australia	EMC, RF, Telecom, SAR, Safety
Korea	EMI, EMS, RF, SAR, Telecom, Safety
Japan	EMI, RF/Wireless, SAR, Telecom
Singapore	EMC, RF, SAR, Telecom
Europe	EMC, RF, SAR, Telecom, Safety

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1. Report Revision History

Report No.	Report Version	Description	Issue Date
16070657-FCC-R1	NONE	Original	June 07, 2016
16070657-FCC-R1	V1	Added GPRS/EGPRS data	June 17, 2016

2. Customer information

Applicant Name	SMT TELECOMM HK LIMITED
Applicant Add	Unit C 8/F, CHARMHILL CTR 50 HILLWOOD RD TST KL
Manufacturer	SMT TELECOMM HK LIMITED
Manufacturer Add	Unit C 8/F, CHARMHILL CTR 50 HILLWOOD RD TST KL

3. Test site information

Lab performing tests	SIEMIC (Shenzhen-China) LABORATORIES
Lab Address	Zone A, Floor 1, Building 2 Wan Ye Long Technology Park South Side of Zhoushi Road, Bao' an District, Shenzhen, Guangdong China 518108
FCC Test Site No.	718246
IC Test Site No.	4842E-1
Test Software	Radiated Emission Program-To Shenzhen v2.0

4. Equipment under Test (EUT) Information

Description of EUT:	Mobile Phone
Main Model:	X410
Serial Model:	N/A
Date EUT received:	November 23, 2015
Test Date(s):	November 24 to December 04, 2015&June 16, 2016
Equipment Category :	PCE
Antenna Gain:	GSM850: -1.2dBi PCS1900: -0.9dBi UMTS-FDD Band V: -1.1dBi UMTS-FDD Band II: -1.0dBi Bluetooth/BLE: -0.5dBi WIFI: -0.5dBi GPS: 0dBi
Type of Modulation:	GSM / GPRS: GMSK UMTS-FDD: QPSK, 16QAM 802.11b/g/n: DSSS, OFDM Bluetooth: GFSK, $\pi/4$ DQPSK, 8DPSK BLE: GFSK GPS: BPSK

	GSM850 TX: 824.2 ~ 848.8 MHz; RX: 869.2 ~ 893.8 MHz
	PCS1900 TX: 1850.2 ~ 1909.8 MHz; RX: 1930.2 ~ 1989.8 MHz
	UMTS-FDD Band V TX: 826.4 ~ 846.6 MHz; RX: 871.4 ~ 891.6 MHz
	UMTS-FDD Band II TX: 1852.4 ~ 1907.6 MHz;
RF Operating Frequency (ies):	RX: 1932.4 ~ 1987.6 MHz
	WIFI:802.11b/g/n(20M): 2412-2462 MHz
	WIFI:802.11n(40M): 2422-2452 MHz
	Bluetooth& BLE: 2402-2480 MHz
	GPS RX:1575.42 MHz
	GSM Vioce: GSM850: 33.36 dBm
	PCS1900: 28.41 dBm
	GPRS: GSM850: 33.24 dBm
	PCS1900: 28.39 dBm
	MCS1:GSM850: 33.28 dBm
Maximum Conducted	PCS1900: 28.39 dBm
AV Power to Antenna:	RMC: UMTS-FDD Band V : 23.95 dBm
	UMTS-FDD Band II : 23.30 dBm
	HSUPA:UMTS-FDD Band 5: 22.52dBm
	UMTS-FDD Band 2: 22.15 dBm
	HSDPA:UMTS-FDD Band 5: 22.49dBm
	UMTS-FDD Band 2: 21.56 dBm
	GSM Vioce: GSM850: 30.01 dBm / ERP
	PCS1900: 27.27 dBm / EIRP
	GPRS:GSM850: 30.18 dBm / ERP
	PCS1900: 27.45 dBm / EIRP
	EGPRS:GSM850: 30.33 dBm / ERP
	PCS1900: 27.85 dBm / EIRP
ERP/EIRP:	RMC: UMTS-FDD Band V : 20.44 dBm / ERP
	UMTS-FDD Band II : 21.89 dBm / EIRP
	HSUPA:UMTS-FDD Band 5: 20.25 dBm / ERP
	UMTS-FDD Band 2: 20.35 dBm / EIRP
	HSDPA:UMTS-FDD Band 5: 20.35 dBm / ERP
	UMTS-FDD Band 2: 21.82 dBm / EIRP

Number of Channels:	GSM 850: 124CH
	PCS1900: 299CH
	UMTS-FDD Band V : 102CH
	UMTS-FDD Band II : 277CH
	WIFI :802.11b/g/n(20M): 11CH
	WIFI :802.11n(40M): 7CH
	Bluetooth: 79CH
	BLE: 40CH
Port:	GPS:1CH
	Power Port, Earphone Port, USB Port
	Battery:
	Model: BP X410
	Standard Voltage:DC3.7V
	Rated Capacity:1200mAh,4.44Wh
	Charging Limited Voltage : 4.2V
	Adapter:
Input Power:	Model: PC X410
	Input: AC100-240V; 50/60Hz; 0.15A
	Output: DC 5.0V,500mA
Trade Name :	N/A
GPRS/EGPRS Multi-slot class	8/10/12
FCC ID:	2AIMEX410

5. Test Summary

The product was tested in accordance with the following specifications.

All testing has been performed according to below product classification:

FCC Rules	Description of Test	Result
§ 1.1307; § 2.1093	RF Exposure (SAR)	Compliance
§2.1046; § 22.913(a); § 24.232(c);	RF Output Power	Compliance
§ 24.232 (d) ; § 27.50(d)	Peak-Average Ratio	Compliance
§ 2.1049; § 22.905; § 22.917; § 24.238;	99% & -26 dB Occupied Bandwidth	Compliance
§ 2.1051; § 22.917(a); § 24.238(a);	Spurious Emissions at Antenna Terminal	Compliance
§ 2.1053; § 22.917(a); § 24.238(a);	Field Strength of Spurious Radiation	Compliance
§ 22.917(a); § 24.238(a);	Out of band emission, Band Edge	Compliance
§ 2.1055; § 22.355; § 24.235;	Frequency stability vs. temperature Frequency stability vs. voltage	Compliance

Note: Testing was performed by configuring EUT to maximum output power status, the declared output power class for different

Measurement Uncertainty

Emissions		
Test Item	Description	Uncertainty
Band Edge and Radiated Spurious Emissions	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+5.6dB/-4.5dB
-	-	-

6. MEASUREMENTS, EXAMINATION AND DERIVED RESULTS

6.1 RF Exposure (SAR)

Test Result: Pass

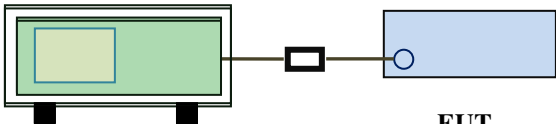
The EUT is a portable device, thus requires SAR evaluation;
Please refer to RF Exposure Evaluation Report: 16070657-FCC-H.

6.2 RF Output Power

Temperature	23°C
Relative Humidity	55%
Atmospheric Pressure	1003mbar
Test date :	December 11, 2015&June 16, 2016
Tested By :	Winnie Zhang& Loren Luo

Requirement(s):

Spec	Item	Requirement	Applicable
§22.913 (a)	a)	ERP:38.45dBm	☒
§24.232 (c)	b)	EIRP:33dBm	☒

Test Setup	 Base Station EUT
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Test Procedure	For Conducted Power: - The transmitter output port was connected to base station. - Set EUT at maximum power through base station. - Select lowest, middle, and highest channels for each band and different test mode. For ERP/EIRP: According with KDB 971168 v02r02 - The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable. - The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis. - The frequency range up to tenth harmonic of the fundamental frequency was investigated. - Remove the EUT and replace it with substitution antenna. A signal
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	generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution. - Spurious emissions in dB = $10 \log (\text{TX power in Watts}/0.001)$ – the absolute level - Spurious attenuation limit in dB = $43 + 10 \text{ Log}_{10} (\text{power out in Watts})$.
Remark	
Result	☒ Pass ☐ Fail

Test Data ☒ Yes ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

Conducted Power

GSM Mode:

Burst Average Power (dBm);								
Band	GSM850				PCS1900			
Channel	128	190	251	Tune up Power tolerant	512	661	810	Tune up Power tolerant
Frequency (MHz)	824.2	836.6	848.8	/	1850.2	1880	1909.8	/
GSM Voice (1 uplink),GMSK	33.23	33.36	33.26	33±1	28.41	28.39	28.31	29±1
GPRS Multi-Slot Class 8 (1 uplink),GMSK	33.22	33.24	33.23	33±1	28.39	28.36	28.29	29±1
GPRS Multi-Slot Class 10 (2 uplink) GMSK	32.18	32.23	32.24	32±1	27.89	27.73	27.32	28±1
GPRS Multi-Slot Class 12 (4 uplink) GMSK	29.75	29.74	29.88	29±1	25.81	25.22	24.43	25±1
EGPRS Multi-Slot Class 8 (1 uplink) GMSK MCS1	33.26	33.28	33.25	33±1	28.39	28.37	28.30	29±1
EGPRS Multi-Slot Class 10 (2 uplink) GMSK MCS1	32.38	32.42	32.43	32±1	27.91	27.75	27.38	28±1
EGPRS Multi-Slot Class 12 (4 uplink) GMSK MCS1	29.66	29.71	29.78	29±1	25.80	25.19	24.42	25±1

Remark :

GPRS, CS1 coding scheme.

EGPRS, MCS1 coding scheme. .

Multi-Slot Class 8 , Support Max 4 downlink, 1 uplink , 5 working link

Multi-Slot Class 10 , Support Max 4 downlink, 2 uplink , 5 working link

Multi-Slot Class 12 , Support Max 4 downlink, 4 uplink , 5 working link

Note: Since GSM mode has higher power, so the test items below were not performed to GPRS and EGPRS mode.

UMTS Mode:

UMTS-FDD Band V

Band/ Time Slot configuration	Channel	Frequency	Average power (dBm)	Tune up Power tolerant
RMC 12.2kbps	4132	826.4	23.76	23±1
	4175	835	23.95	23±1
	4233	846.6	23.73	23±1
HSDPA Subtest1	4132	826.4	22.46	22±1
	4175	835	22.43	22±1
	4233	846.6	22.48	22±1
HSDPA Subtest2	4132	826.4	22.51	22±1
	4175	835	22.49	22±1
	4233	846.6	22.47	22±1
HSDPA Subtest3	4132	826.4	22.48	22±1
	4175	835	22.41	22±1
	4233	846.6	22.45	22±1
HSDPA Subtest4	4132	826.4	22.52	22±1
	4175	835	22.39	22±1
	4233	846.6	22.46	22±1
HSUPA Subtest1	4132	826.4	22.47	22±1
	4175	835	22.38	22±1
	4233	846.6	22.39	22±1
HSUPA Subtest2	4132	826.4	22.49	22±1
	4175	835	22.45	22±1
	4233	846.6	22.43	22±1
HSUPA Subtest3	4132	826.4	22.41	22±1
	4175	835	22.42	22±1
	4233	846.6	22.42	22±1
HSUPA Subtest4	4132	826.4	22.47	22±1
	4175	835	22.43	22±1
	4233	846.6	22.45	22±1
HSUPA Subtest5	4132	826.4	22.44	22±1
	4175	835	22.43	22±1
	4233	846.6	22.47	22±1

UMTS-FDD Band II

Band/ Time Slot configuration	Channel	Frequency	Average power (dBm)	Tune up Power tolerant
RMC 12.2kbps	9262	1852.4	23.30	23±1
	9400	1880	20.51	21.3±1
	9538	1907.6	21.22	21.3±1
HSDPA Subtest1	9262	1852.4	22.15	21.3±1
	9400	1880	20.56	21.3±1
	9538	1907.6	20.69	21.3±1
HSDPA Subtest2	9262	1852.4	21.59	21.3±1
	9400	1880	20.68	21.3±1
	9538	1907.6	20.63	21.3±1
HSDPA Subtest3	9262	1852.4	21.64	21.3±1
	9400	1880	20.56	21.3±1
	9538	1907.6	20.49	21.3±1
HSDPA Subtest4	9262	1852.4	21.35	21.3±1
	9400	1880	20.86	21.3±1
	9538	1907.6	20.66	21.3±1
HSUPA Subtest1	9262	1852.4	21.48	21.3±1
	9400	1880	20.69	21.3±1
	9538	1907.6	20.86	21.3±1
HSUPA Subtest2	9262	1852.4	21.46	21.3±1
	9400	1880	20.56	21.3±1
	9538	1907.6	20.55	21.3±1
HSUPA Subtest3	9262	1852.4	21.56	21.3±1
	9400	1880	20.62	21.3±1
	9538	1907.6	20.68	21.3±1
HSUPA Subtest4	9262	1852.4	21.47	21.3±1
	9400	1880	20.71	21.3±1
	9538	1907.6	20.64	21.3±1
HSUPA Subtest5	9262	1852.4	21.53	21.3±1
	9400	1880	20.75	21.3±1
	9538	1907.6	20.74	21.3±1

ERP & EIRP

GSM Voice:

ERP for Cellular Band (Part 22H)

Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
824.2	23.68	V	6.8	0.53	29.95	38.45
824.2	22.16	H	6.8	0.53	28.43	38.45
836.6	23.72	V	6.8	0.53	29.99	38.45
836.6	22.15	H	6.8	0.53	28.42	38.45
848.8	23.64	V	6.9	0.53	30.01	38.45
848.8	22.07	H	6.9	0.53	28.44	38.45

EIRP for PCS Band (Part 24E)

Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
1850.2	20.22	V	7.88	0.85	27.25	33
1850.2	18.49	H	7.88	0.85	25.52	33
1880	20.18	V	7.88	0.85	27.21	33
1880	18.43	H	7.88	0.85	25.46	33
1909.8	20.26	V	7.86	0.85	27.27	33
1909.8	18.52	H	7.86	0.85	25.53	33

GPRS:

ERP for Cellular Band (Part 22H)

Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
824.2	23.48	V	6.8	0.53	29.75	38.45
824.2	22.36	H	6.8	0.53	28.63	38.45
836.6	22.93	V	6.8	0.53	29.20	38.45
836.6	22.04	H	6.8	0.53	28.31	38.45
848.8	23.81	V	6.9	0.53	30.18	38.45
848.8	22.30	H	6.9	0.53	28.67	38.45

EIRP for PCS Band (Part 24E)

Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
1850.2	20.35	V	7.88	0.85	27.38	33
1850.2	18.23	H	7.88	0.85	25.26	33
1880	20.33	V	7.88	0.85	27.36	33
1880	18.19	H	7.88	0.85	25.22	33
1909.8	20.44	V	7.86	0.85	27.45	33
1909.8	18.80	H	7.86	0.85	25.81	33

EGPRS (MCS1):

ERP for Cellular Band (Part 22H)

Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
824.2	23.30	V	6.8	0.53	29.57	38.45
824.2	21.98	H	6.8	0.53	28.25	38.45
836.6	23.14	V	6.8	0.53	29.41	38.45
836.6	22.25	H	6.8	0.53	28.52	38.45
848.8	23.96	V	6.9	0.53	30.33	38.45
848.8	22.50	H	6.9	0.53	28.87	38.45

EIRP for PCS Band (Part 24E)

Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
1850.2	20.82	V	7.88	0.85	27.85	33
1850.2	18.6	H	7.88	0.85	25.63	33
1880	20.19	V	7.88	0.85	27.22	33
1880	18.42	H	7.88	0.85	25.45	33
1909.8	20.32	V	7.86	0.85	27.33	33
1909.8	18.21	H	7.86	0.85	25.22	33

RMC:

ERP for UMTS-FDD Band V (Part 22H)

Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
826.4	14.06	V	6.8	0.53	20.33	38.45
826.4	12.34	H	6.8	0.53	18.61	38.45
835	14.17	V	6.8	0.53	20.44	38.45
835	12.41	H	6.8	0.53	18.68	38.45
846.6	14.04	V	6.9	0.53	20.41	38.45
846.6	12.38	H	6.9	0.53	18.75	38.45

EIRP for UMTS-FDD Band II (Part 24E)

Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
1852.4	14.86	V	7.88	0.85	21.89	33
1852.4	13.12	H	7.88	0.85	20.15	33
1880	14.75	V	7.88	0.85	21.78	33
1880	13.06	H	7.88	0.85	20.09	33
1907.6	14.72	V	7.86	0.85	21.73	33
1907.6	12.97	H	7.86	0.85	19.98	33

HSDPA:

ERP for UMTS-FDD Band V (Part 22H)

Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
826.4	13.85	V	6.8	0.53	20.12	38.45
826.4	12.08	H	6.8	0.53	18.35	38.45
835	13.98	V	6.8	0.53	20.25	38.45
835	12.28	H	6.8	0.53	18.55	38.45
846.6	13.87	V	6.9	0.53	20.24	38.45
846.6	12.28	H	6.9	0.53	18.65	38.45

EIRP for UMTS-FDD Band II (Part 24E)

Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
1852.4	14.50	V	7.88	0.85	21.53	33
1852.4	13.32	H	7.88	0.85	20.35	33
1880	14.63	V	7.88	0.85	21.66	33
1880	13.12	H	7.88	0.85	20.15	33
1907.6	14.32	V	7.86	0.85	21.33	33
1907.6	12.76	H	7.86	0.85	19.77	33

HSUPA:

ERP for UMTS-FDD Band V (Part 22H)

Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
826.4	14.08	V	6.8	0.53	20.35	38.45
826.4	12.42	H	6.8	0.53	18.69	38.45
835	14.18	V	6.8	0.53	20.45	38.45
835	12.41	H	6.8	0.53	18.68	38.45
846.6	13.95	V	6.9	0.53	20.32	38.45
846.6	12.40	H	6.9	0.53	18.77	38.45

EIRP for UMTS-FDD Band II (Part 24E)

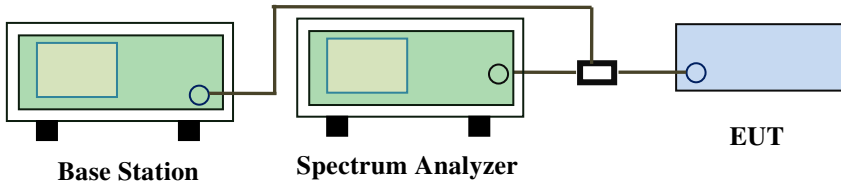
Frequency (MHz)	Substituted level (dBm)	Antenna Polarization	Antenna Gain correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)
1852.4	14.72	V	7.88	0.85	21.75	33
1852.4	13.45	H	7.88	0.85	20.48	33
1880	14.79	V	7.88	0.85	21.82	33
1880	13.41	H	7.88	0.85	20.44	33
1907.6	14.64	V	7.86	0.85	21.65	33
1907.6	12.8	H	7.86	0.85	19.81	33

6.3 Peak-Average Ratio

Temperature	23°C
Relative Humidity	55%
Atmospheric Pressure	1003mbar
Test date :	December 11, 2015&June 16, 2016
Tested By :	Winnie Zhang& Loren Luo

Requirement(s):

Spec	Item	Requirement	Applicable
§24.232(d)	a)	The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.	☒

Test Setup	 The diagram illustrates the test setup. On the left is a green box labeled 'Base Station'. A cable connects it to a green box labeled 'Spectrum Analyzer'. Another cable connects the Spectrum Analyzer to a blue box labeled 'EUT' (Equipment Under Test).
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Test Procedure	According with KDB 971168 v02r02 5.7.2 Alternate procedure for PAPR 5.1.2 Peak power measurements with a peak power meter The total peak output power may be measured using a broadband peak RF power meter. The power meter must have a video bandwidth that is greater than or equal to the emission bandwidth and utilize a fast-responding diode detector. 5.2.3 Average power measurement with average power meter As an alternative to the use of a spectrum/signal analyzer or EMI receiver to perform a measurement of the total in-band average output power, a wideband RF average power meter with a thermocouple detector or equivalent can be used under certain conditions If the EUT can be configured to transmit continuously (i.e., the burst duty cycle $\geq 98\%$) and at all times the EUT is transmitting at its maximum output
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	power level, then a conventional wide-band RF power meter can be used. If the EUT cannot be configured to transmit continuously (i.e., the burst duty cycle < 98%), then there are two options for the use of an average power meter. First, a gated average power meter can be used to perform the measurement if the gating parameters can be adjusted such that the power is measured only over active transmission bursts at maximum output power levels. A conventional average power meter can also be used if the measured burst duty cycle is constant (i.e., duty cycle variations are less than ± 2 percent) by performing the measurement over the on/off burst cycles and then correcting (increasing) the measured level by a factor equal to $10\log(1/\text{duty cycle})$
Remark	
Result	☒ Pass ☐ Fail

Test Data ☒ Yes ☐ N/A
 Test Plot ☐ Yes (See below) ☒ N/A

GSM : GSM 1900 PK-AV POWER (PART 24E)

Frequency (MHz)	Conducted power(dBm)		Peak-Average Ratio(PAR)
	Peak	Average	
1850.2	30.31	28.41	1.9
1880	30.12	28.39	1.73
1909.8	30.2	28.31	1.89

GPRS 1900 PK-AV POWER (PART 24E)

Frequency (MHz)	Conducted power(dBm)		Peak-Average Ratio(PAR)
	Peak	Average	
1850.2	30.24	28.39	1.85
1880	30.56	28.36	2.20
1909.8	30.68	28.29	2.39

EGPRS (MSC1) 1900 PK-AV POWER (PART 24E)

Frequency (MHz)	Conducted power(dBm)		Peak-Average Ratio(PAR)
	Peak	Average	
1850.2	30.69	28.39	2.30
1880	30.79	28.37	2.42
1909.8	30.77	28.3	2.47

RMC : UMTS-FDD Band II PK-AV POWER(PART 24E)

Frequency (MHz)	Conducted power(dBm)		Peak-Average Ratio(PAR)
	Peak	Average	
1852.4	25.73	23.3	2.43
1880	23.08	20.51	2.57
1907.6	23.81	21.22	2.59

HSUPA : UMTS-FDD Band 2 PK-AV POWER (PART 24E)

Frequency (MHz)	Conducted power(dBm)		Peak-Average Ratio(PAR)
	Peak	Average	
1852.4	25.36	21.48	3.88
1880	26.02	20.69	5.33
1907.6	26.11	20.86	5.25

HSDPA : UMTS-FDD Band 2 PK-AV POWER (PART 24E)

Frequency (MHz)	Conducted power(dBm)		Peak-Average Ratio(PAR)
	Peak	Average	
1852.4	26.25	22.15	4.10
1880	26.21	20.56	5.65
1907.6	26.09	20.69	5.40

6.4 Occupied Bandwidth

Temperature	23°C
Relative Humidity	55%
Atmospheric Pressure	1003mbar
Test date :	December 21, 2015&June 16, 2016
Tested By :	Winnie Zhang& Loren Luo

Requirement(s):

Spec	Item	Requirement	Applicable
§2.1049, §22.917, §22.905 §24.238	a)	99% Occupied Bandwidth(kHz)	☒
	b)	26 dB Bandwidth(kHz)	☒
Test Setup	Base Station Spectrum Analyzer EUT		
Test Procedure	- The EUT was connected to Spectrum Analyzer and Base Station via power divider. - The 99% and 26 dB occupied bandwidth (BW) of the middle channel for the highest RF powers.		
Remark			
Result	☒ Pass ☐ Fail		

Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

GSM Voice:

Cellular Band (Part 22H) result

Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Bandwidth (kHz)
128	824.2	275.11	344.5
190	836.6	277.72	338.7
251	848.8	276.45	338.2

PCS Band (Part 24E) result

Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Bandwidth (kHz)
512	1850.2	247.42	319.4
661	1880.0	245.99	315.5
810	1909.8	247.63	323.4

GPRS:

Cellular Band (Part 22H) result

Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Bandwidth (kHz)
128	824.2	247.86	328.5
190	836.6	243.77	315.5
251	848.8	245.19	314.2

PCS Band (Part 24E) result

Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Bandwidth (kHz)
512	1850.2	242.87	311.9
661	1880.0	246.14	315.0
810	1909.8	241.40	315.3

EGPRS (MCS 1):

Cellular Band (Part 22H) result

Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Bandwidth (kHz)
128	824.2	243.85	325.9
190	836.6	247.43	318.9
251	848.8	242.14	313.4

PCS Band (Part 24E) result

Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Bandwidth (kHz)
512	1850.2	246.29	318.6
661	1880.0	244.13	317.2
810	1909.8	241.89	323.6

RMC:

UMTS-FDD Band V (Part 22H)

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
4132	826.4	4.1606	4.684
4175	835.0	4.1556	4.700
4233	846.6	4.1539	4.683

UMTS-FDD Band II (Part 24E)

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
9262	1852.4	4.1956	4.755
9400	1880.0	4.1907	4.745
9538	1907.6	4.2013	4.761

HSUPA:

UMTS-FDD Band V (Part 22H)

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
4132	826.4	4.1702	4.690
4175	835.0	4.1546	4.677
4233	846.6	4.1792	4.678

UMTS-FDD Band II (Part 24E)

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
9262	1852.4	4.1963	4.724
9400	1880.0	4.2119	4.763
9538	1907.6	4.2044	4.772

HSDPA:

UMTS-FDD Band V (Part 22H)

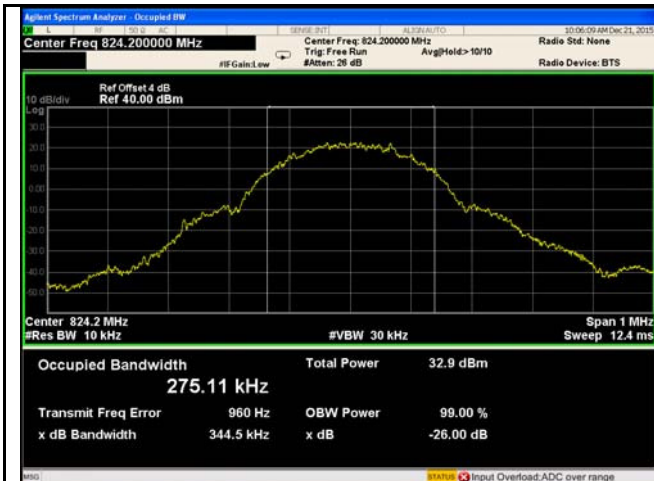
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
4132	826.4	4.1643	4.694
4175	835.0	4.1499	4.686
4233	846.6	4.1893	4.689

UMTS-FDD Band II (Part 24E)

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
9262	1852.4	4.1980	4.730
9400	1880.0	4.2104	4.754
9538	1907.6	4.1996	4.778

Test Plots

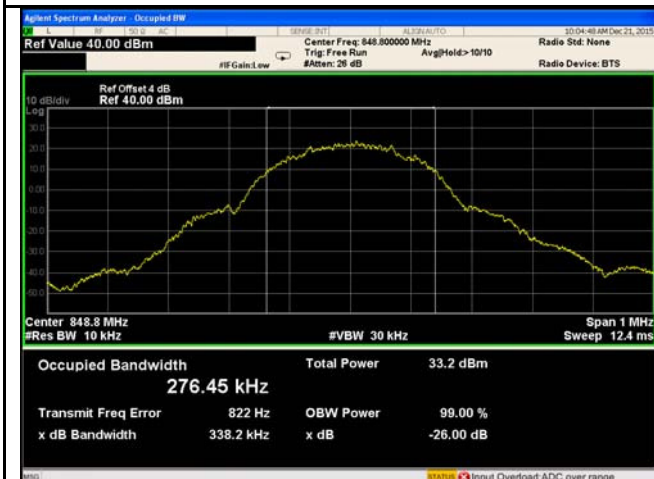
GMS Voice:



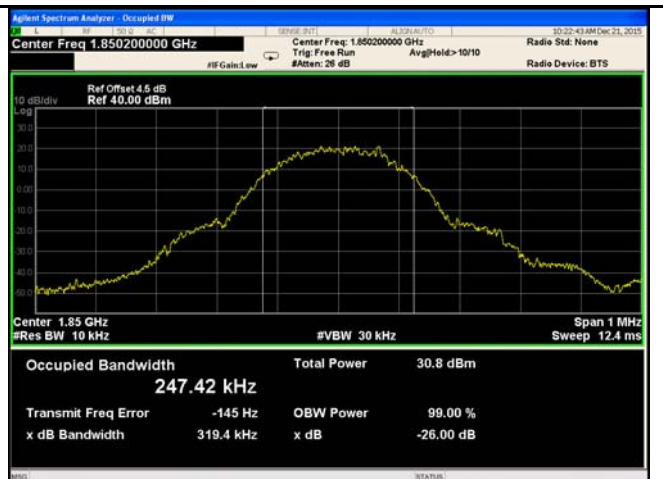
GSM 850 BW - Low CH 824.2MHz



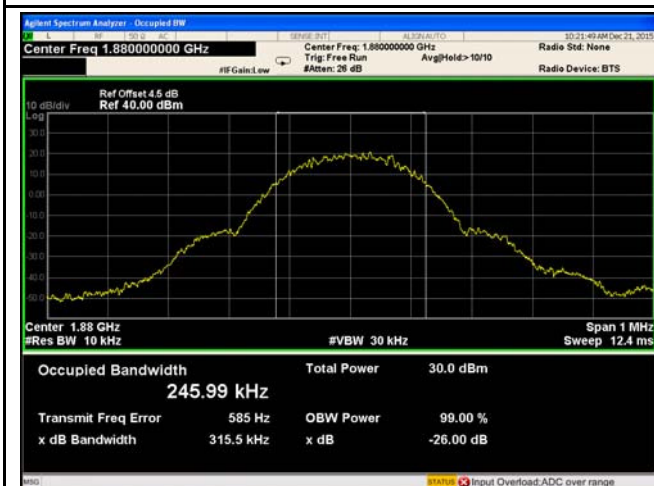
GSM 850 BW - Mid CH 836.6MHz



GSM 850 BW - High CH 848.8MHz



PCS 1900 BW - Low CH 1850.2MHz

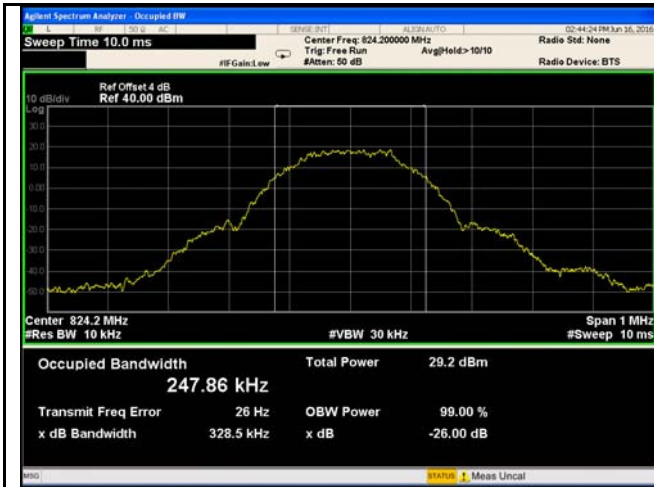


PCS 1900 BW - Mid CH 1880MHz

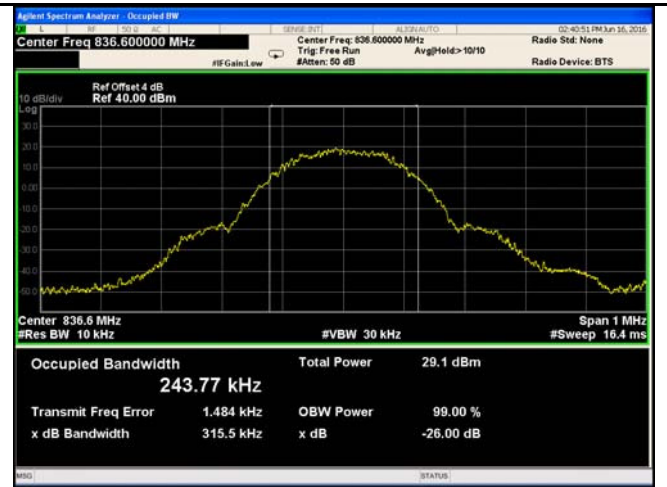


PCS 1900 BW - High CH 1909.8MHz

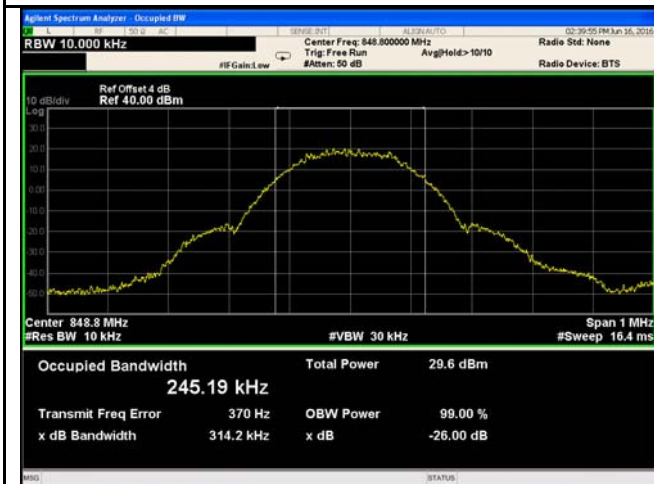
GPRS:



GSM 850 BW - Low CH 824.2MHz



GSM 850 BW - Mid CH 836.6MHz



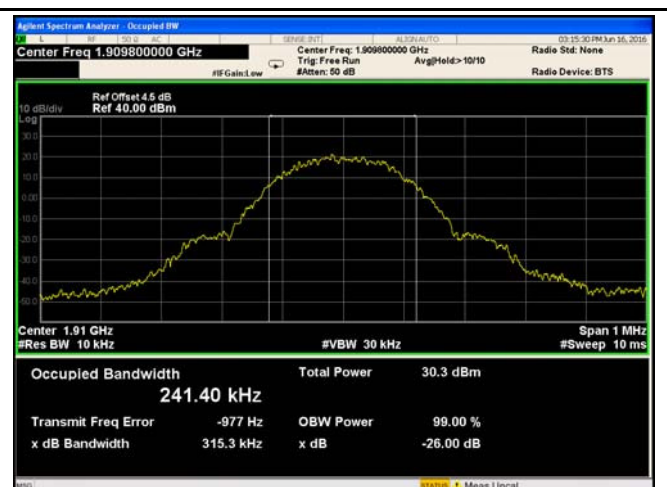
GSM 850 BW - High CH 848.8MHz



PCS 1900 BW - Low CH 1850.2MHz

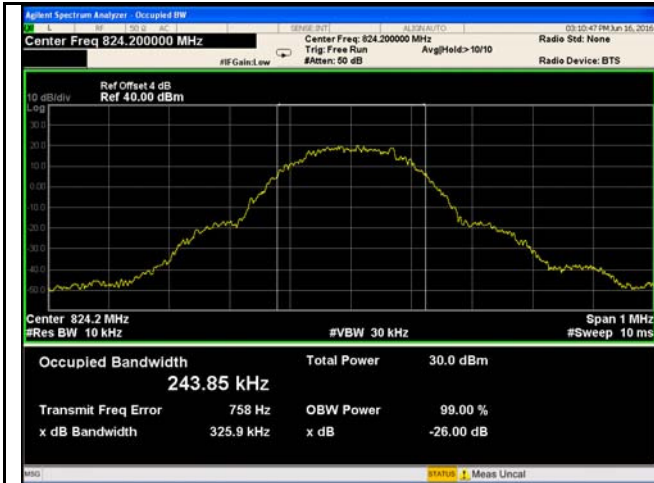


PCS 1900 BW - Mid CH 1880MHz



PCS 1900 BW - High CH 1909.8MHz

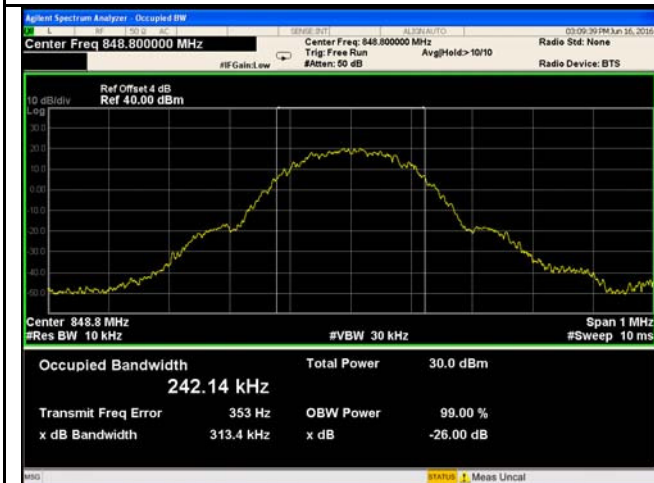
EGPRS:



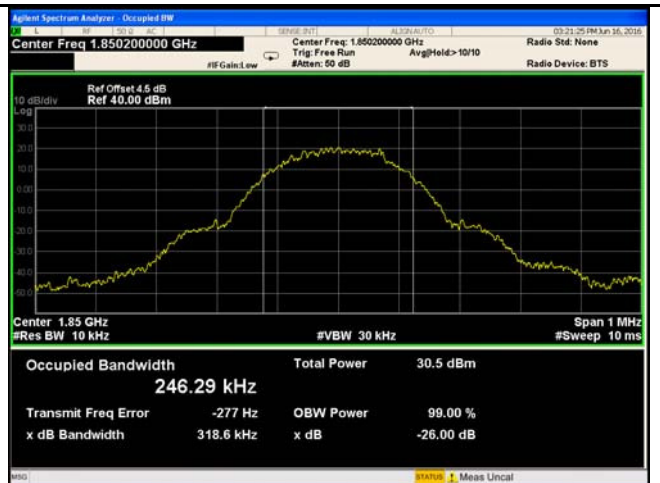
GSM 850 BW - Low CH 824.2MHz



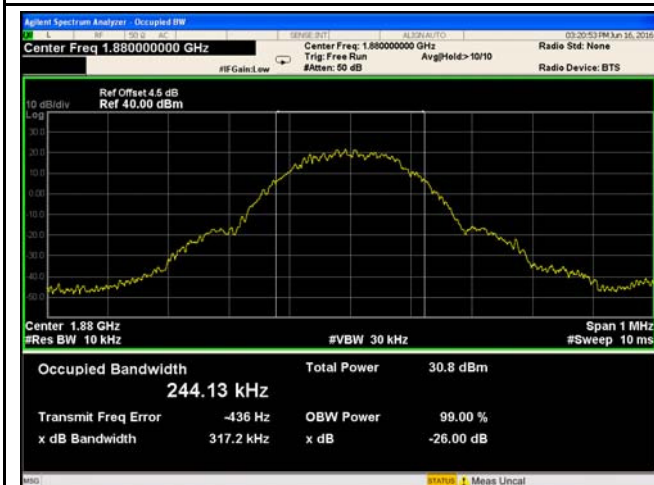
GSM 850 BW - Mid CH 836.6MHz



GSM 850 BW - High CH 848.8MHz



PCS 1900 BW - Low CH 1850.2MHz

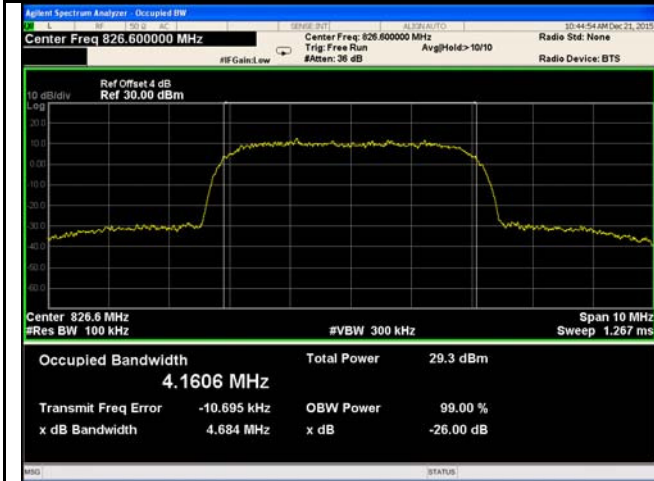


PCS 1900 BW - Mid CH 1880MHz

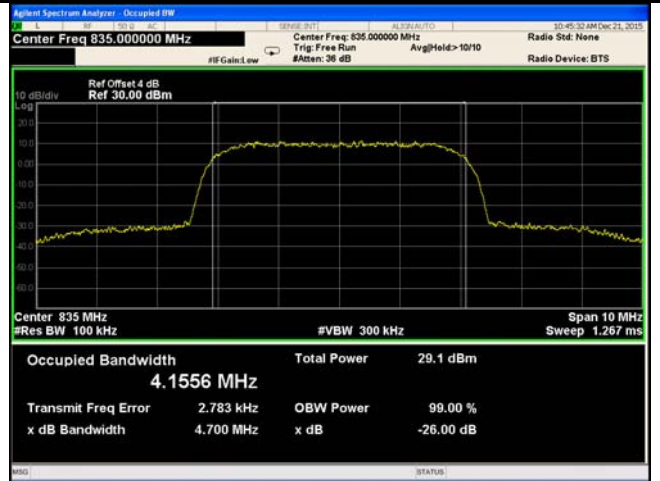


PCS 1900 BW - High CH 1909.8MHz

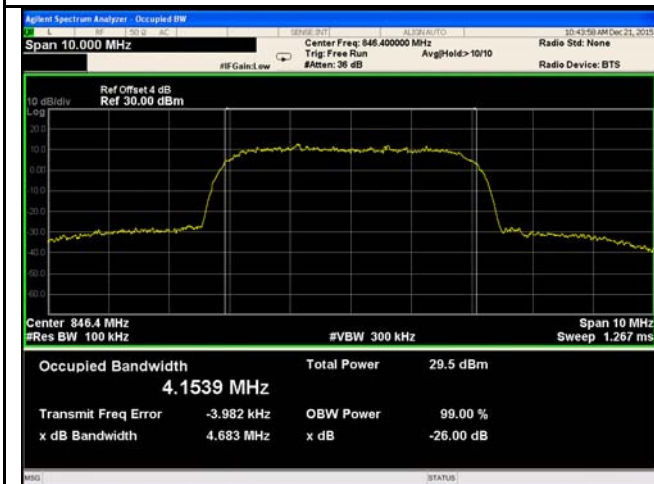
RMC:



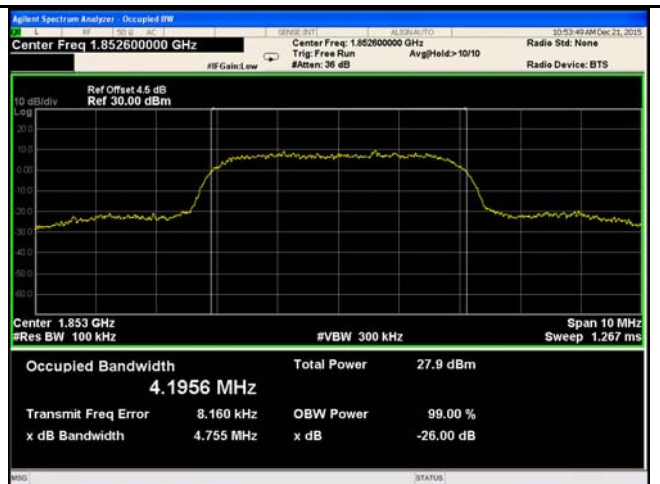
Band V BW - Low CH 826.6 MHz



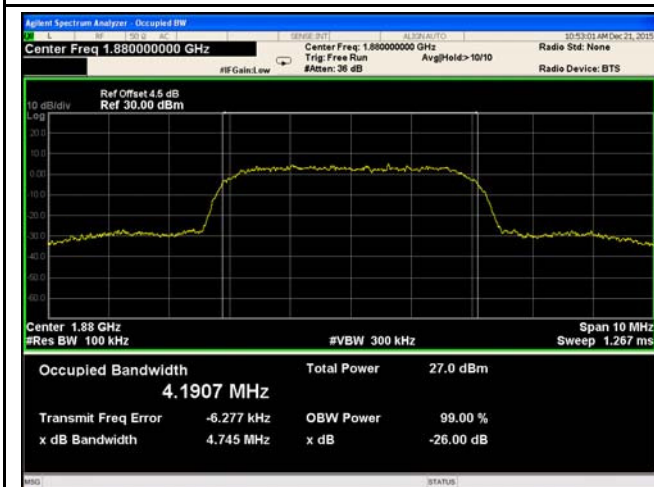
Band V BW - Mid CH 835.0 MHz



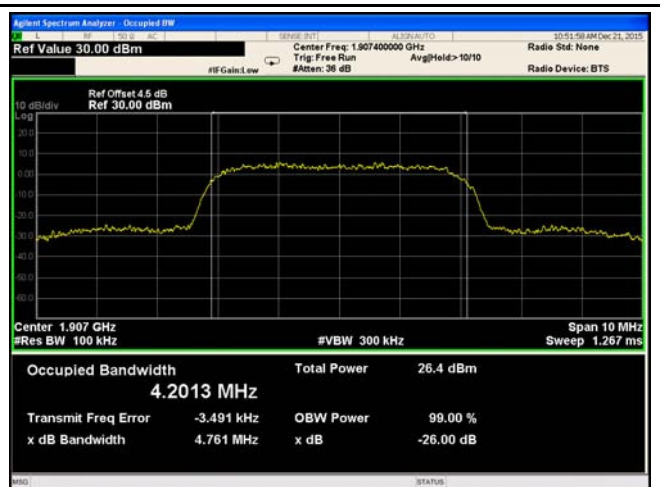
Band V BW - High CH 846.4 MHz



Band II BW - Low CH 1852.4 MHz

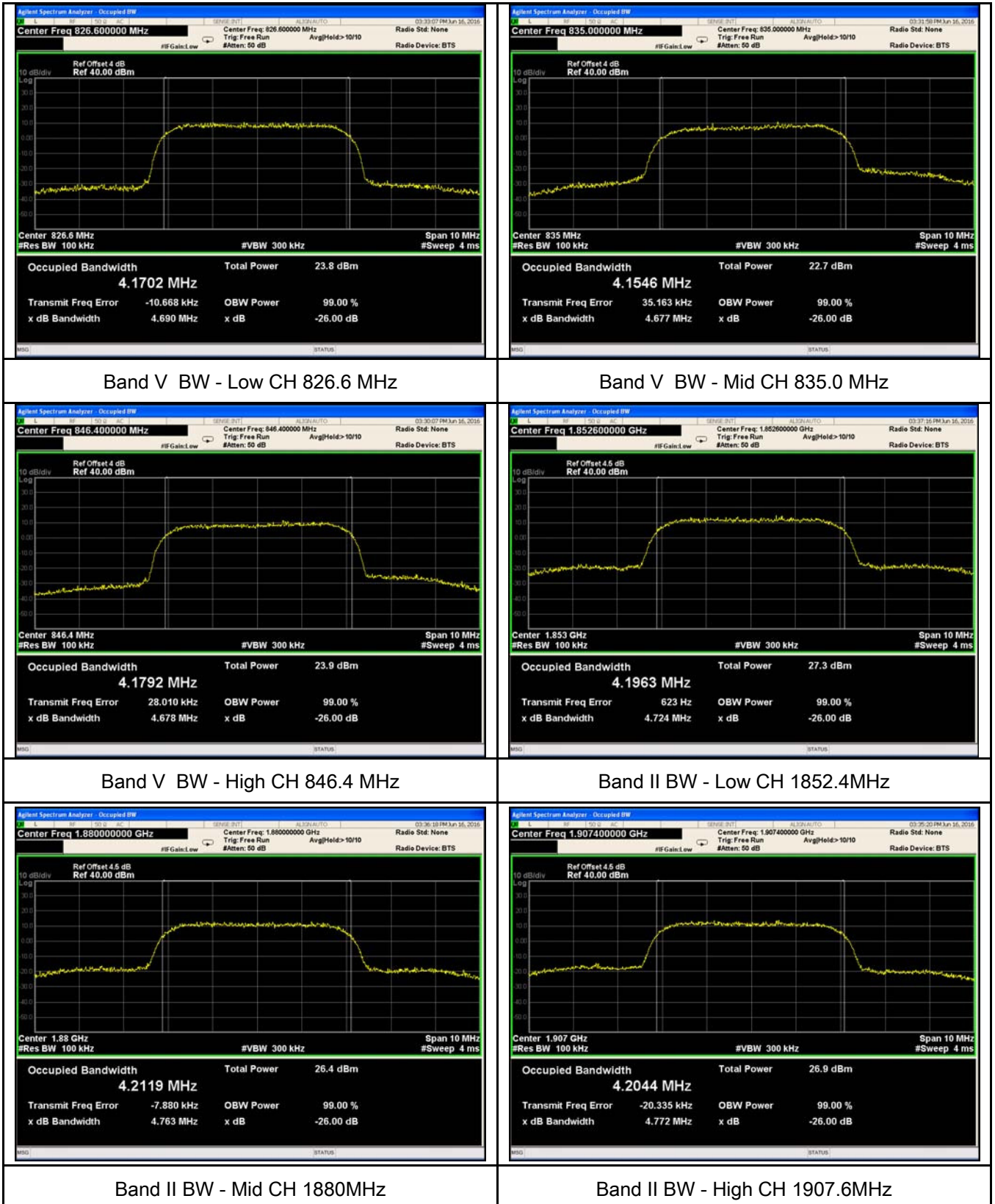


Band II BW - Mid CH 1880 MHz

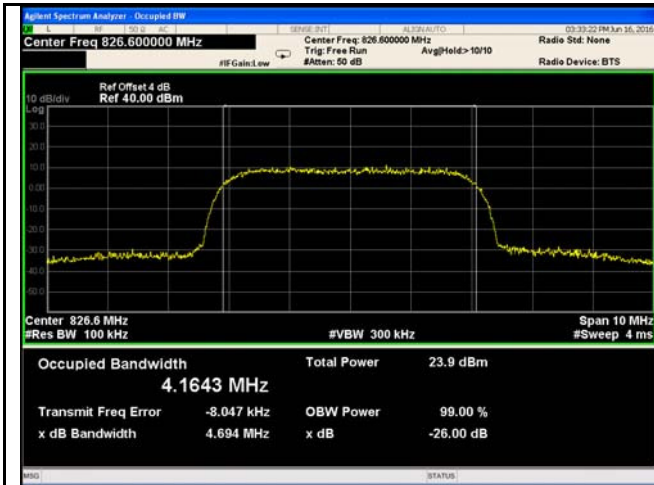


Band II BW - High CH 1907.6 MHz

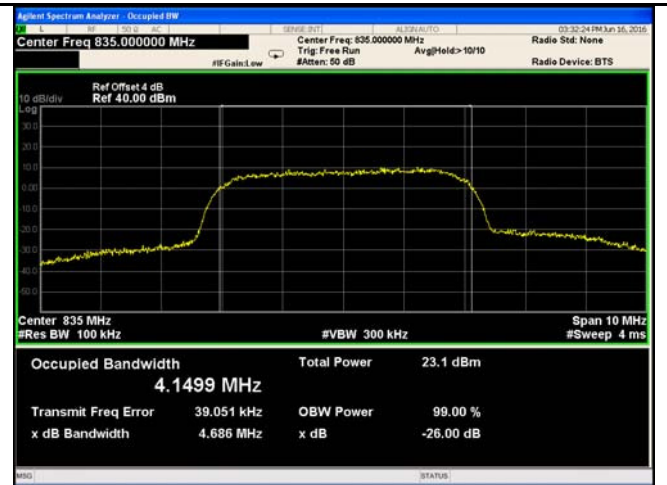
HSUPA:



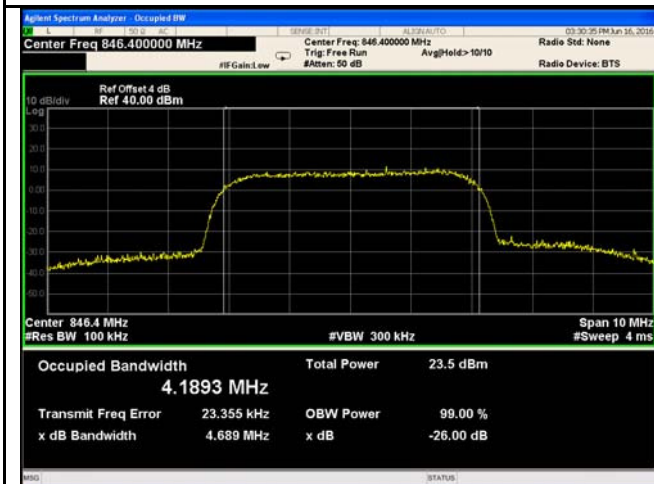
HSDPA:



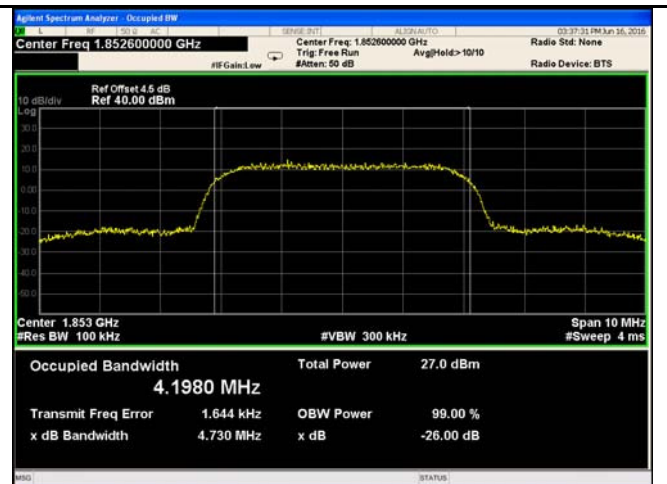
Band V BW - Low CH 826.6 MHz



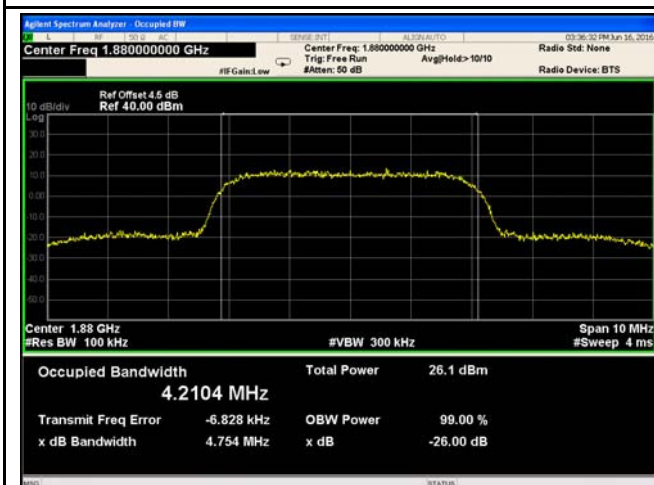
Band V BW - Mid CH 835.0 MHz



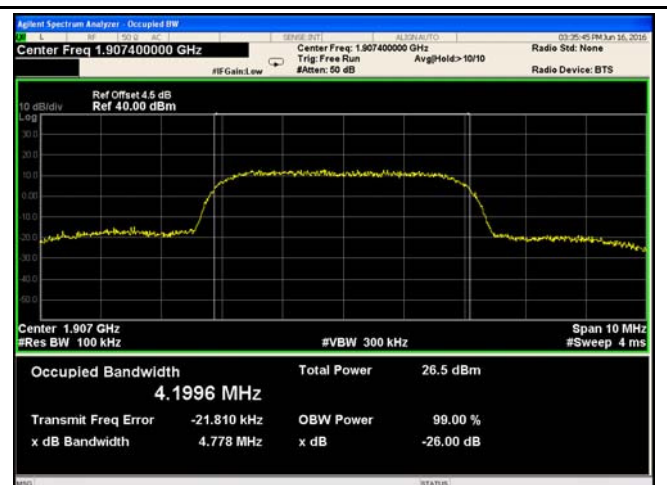
Band V BW - High CH 846.4 MHz



Band II BW - Low CH 1852.4 MHz



Band II BW - Mid CH 1880 MHz

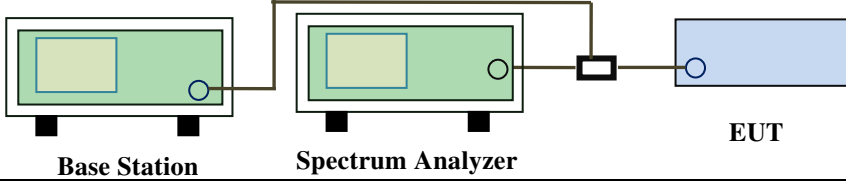


Band II BW - High CH 1907.6 MHz

6.5 Spurious Emissions at Antenna Terminals

Temperature	23°C
Relative Humidity	55%
Atmospheric Pressure	1003mbar
Test date :	December 23, 2015&June 16, 2016
Tested By :	Winnie Zhang& Loren Luo

Requirement(s):

Spec	Item	Requirement	Applicable
§2.1051, §22.917(a)& §24.238(a)	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		
Test 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		

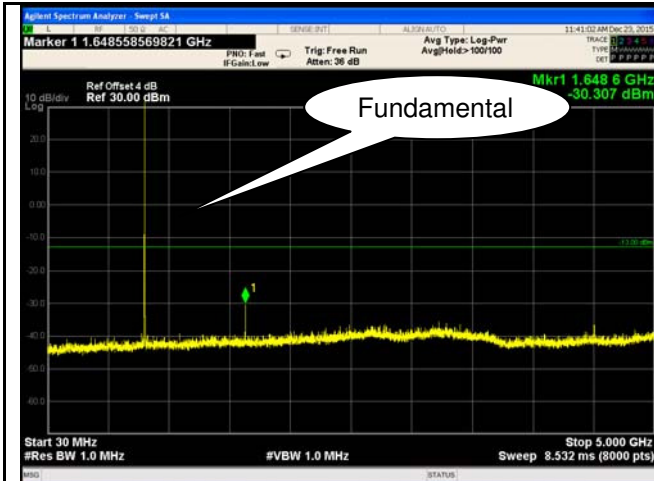
Test Data ☒ Yes ☐ N/A

Test Plot ☒ Yes (See below) ☐ N/A

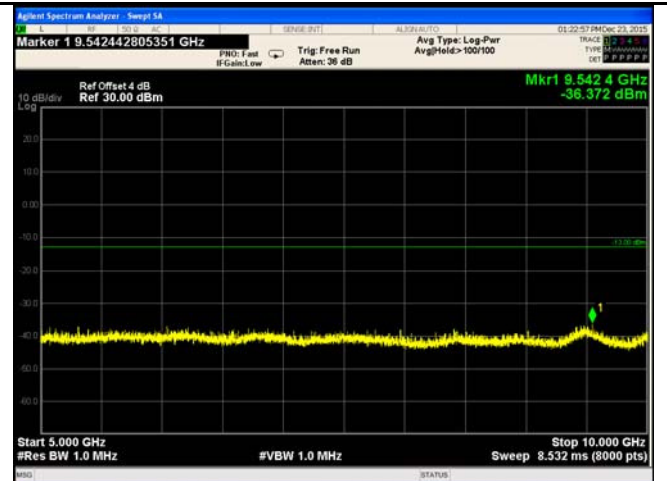
Test Plots

GSM Voice:

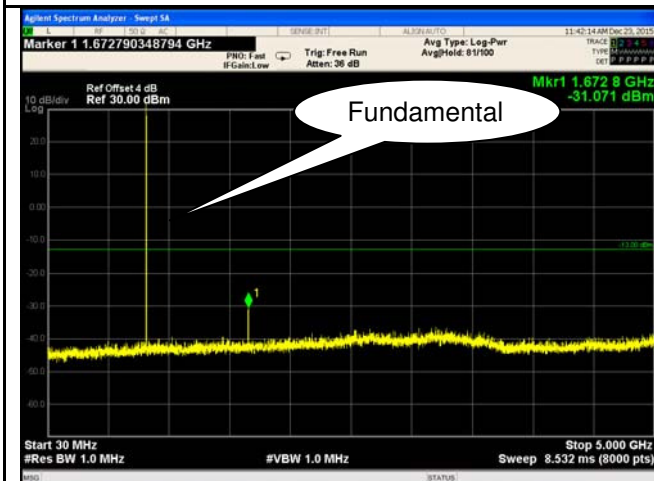
Cellular Band (Part 22H) result



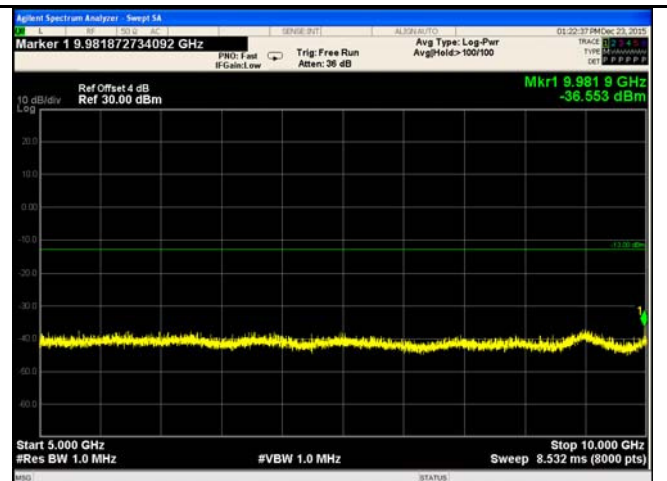
GSM 850 - Low Channel-1



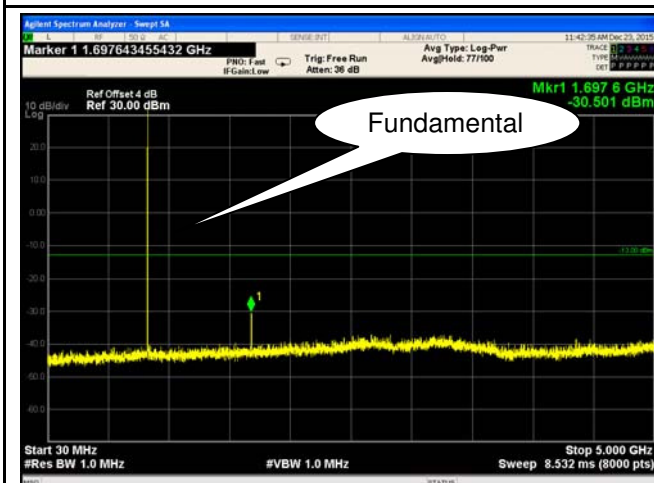
GSM 850 - Low Channel-2



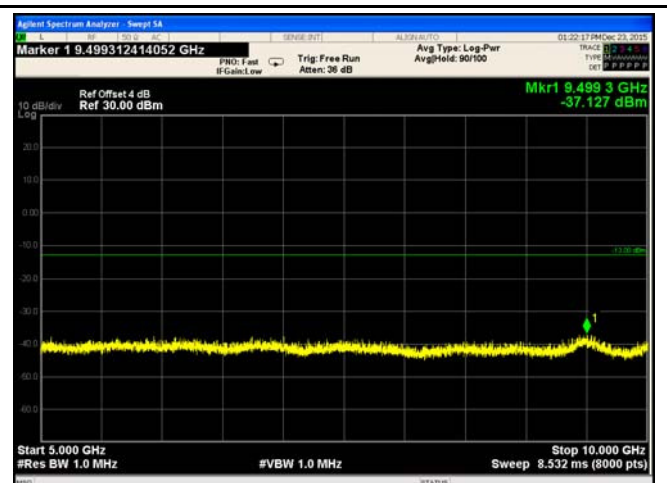
GSM 850 Middle Channel-1



GSM 850 Middle Channel-2

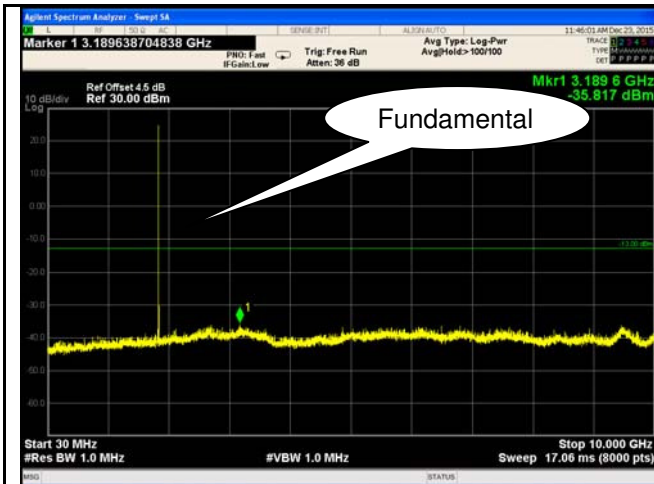


GSM 850 - High Channel-1



GSM 850 - High Channel-2

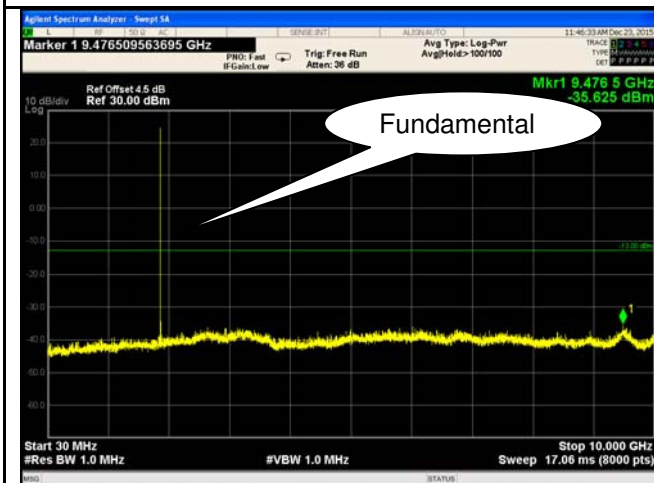
PCS Band (Part24E) result



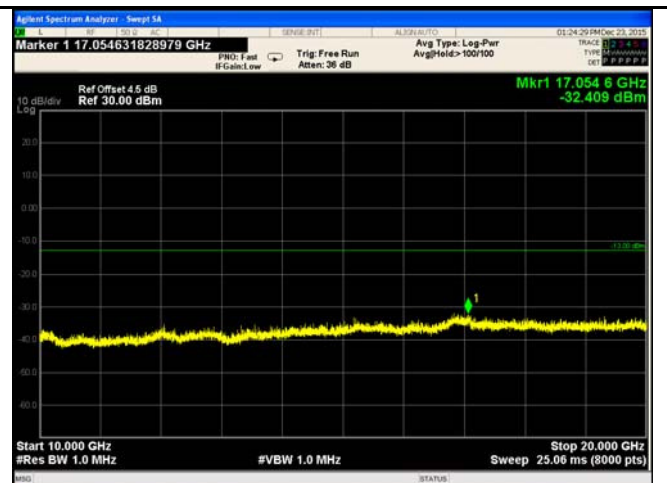
PCS1900 - Low Channel-1



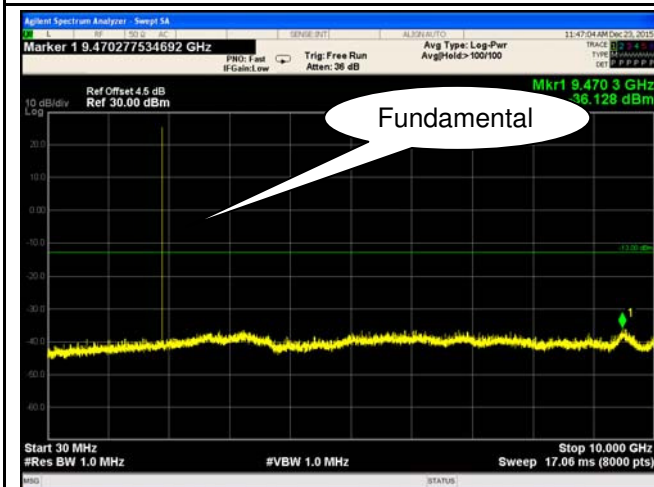
PCS 1900 - Low Channel-2



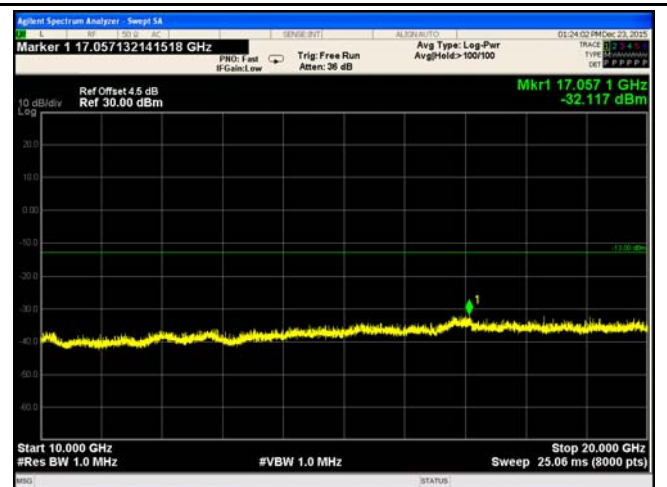
PCS1900 - Middle Channel-1



PCS 1900 - Middle Channel-2



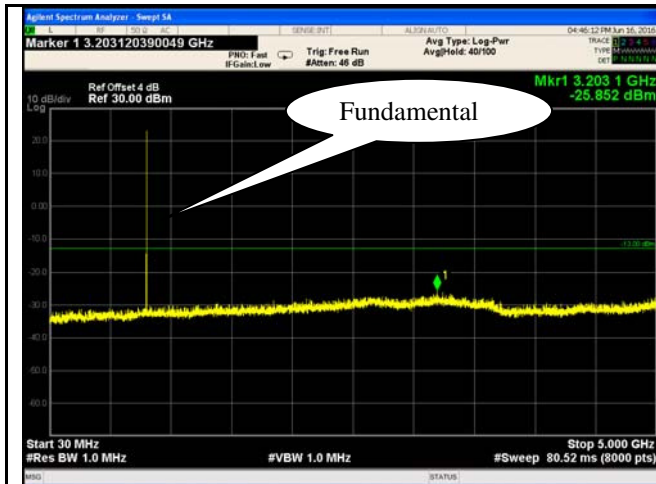
PCS1900 - High Channel-1



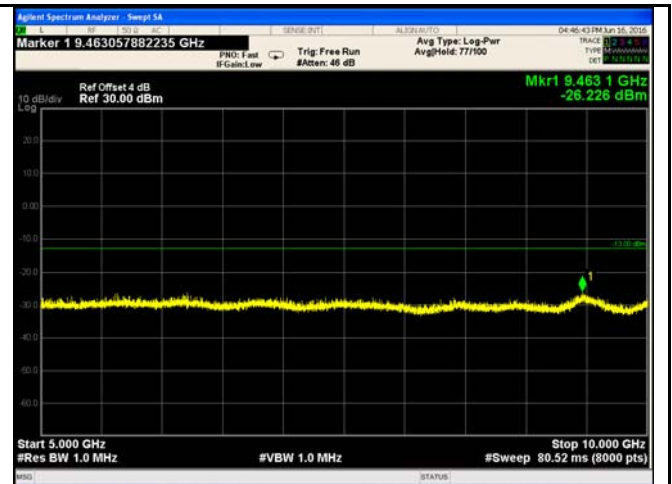
PCS 1900 - High Channel-2

GPRS:

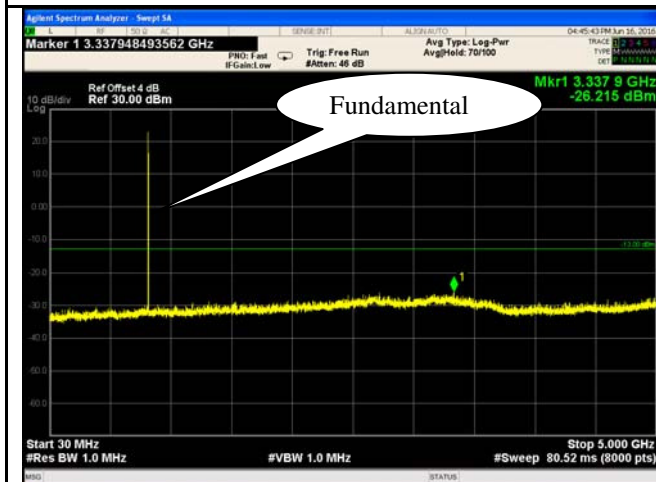
Cellular Band (Part 22H) result



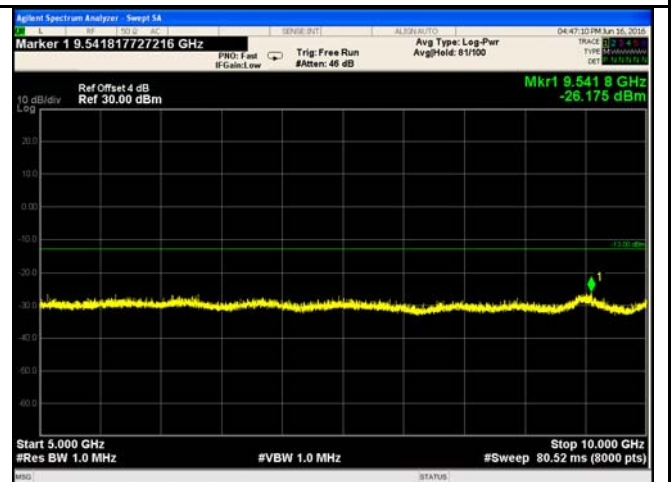
GSM 850 - Low Channel-1



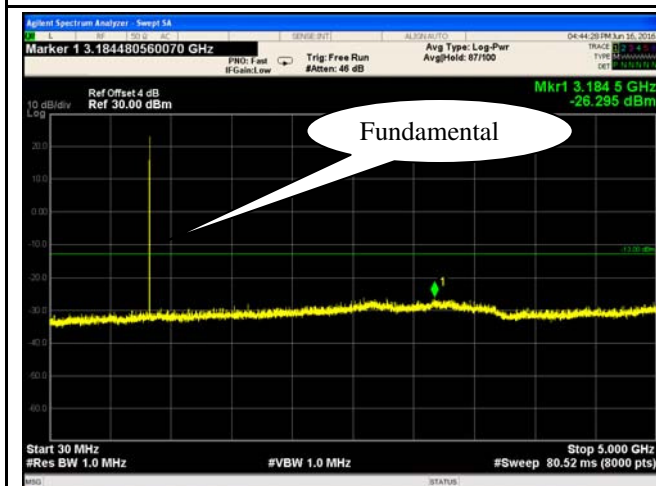
GSM 850 - Low Channel-2



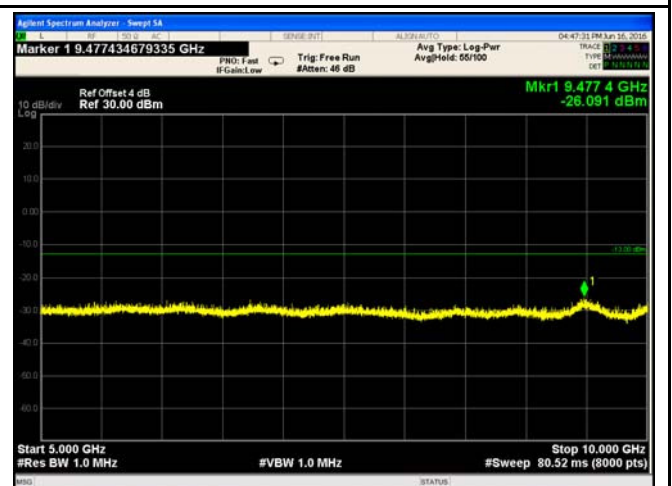
GSM 850 Middle Channel-1



GSM 850 Middle Channel-2

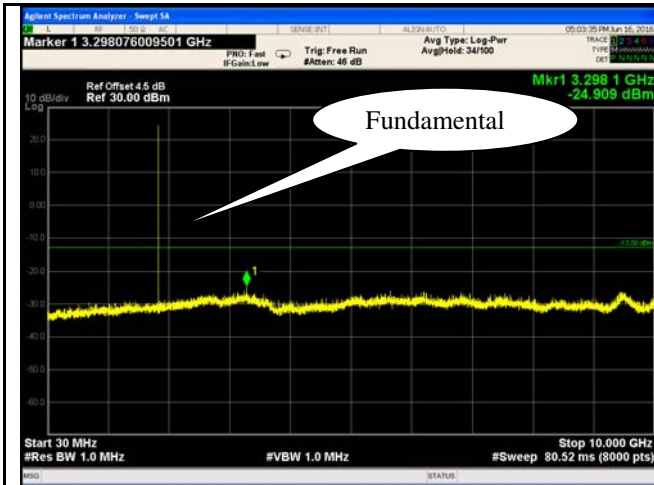


GSM 850 - High Channel-1

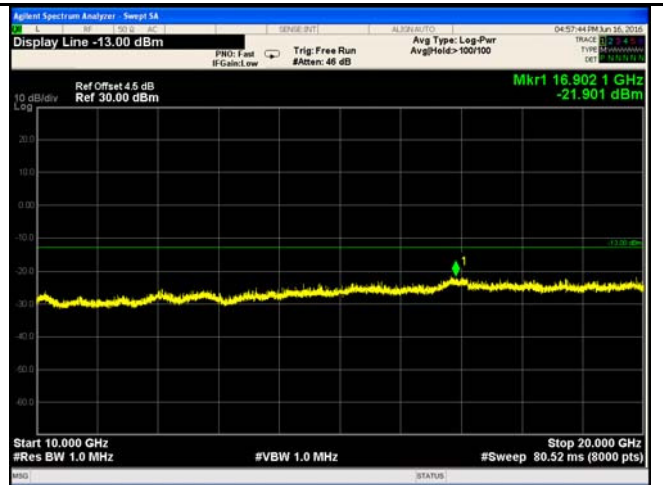


GSM 850 - High Channel-2

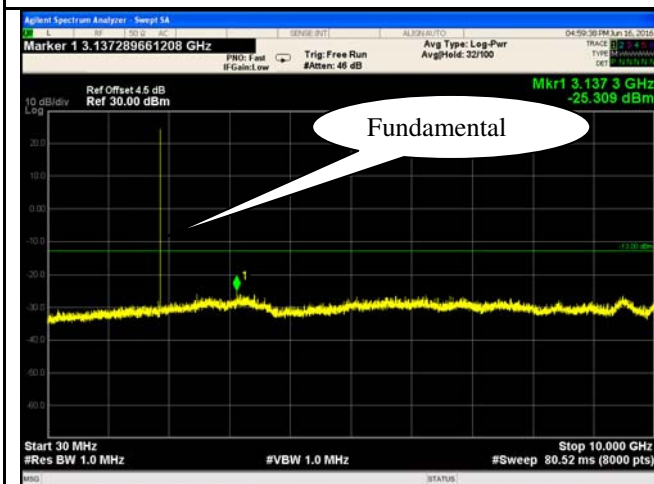
PCS Band (Part24E) result



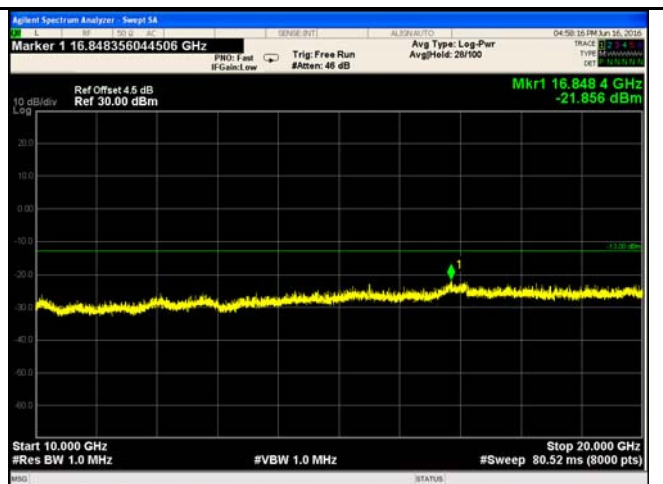
PCS1900 - Low Channel-1



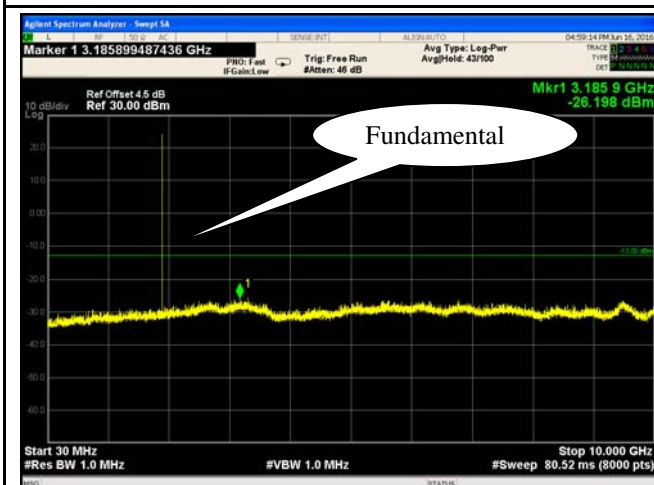
PCS 1900 - Low Channel-2



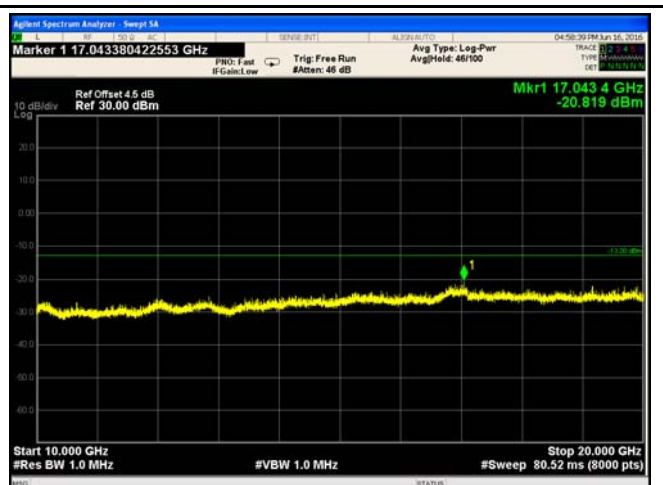
PCS1900 - Middle Channel-1



PCS 1900 - Middle Channel-2



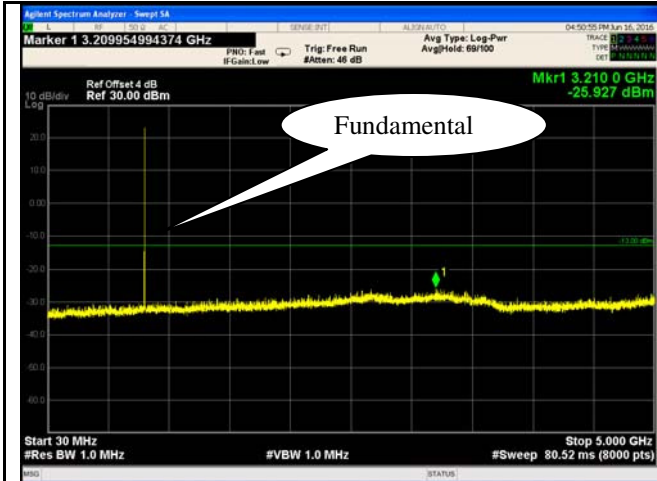
PCS1900 - High Channel-1



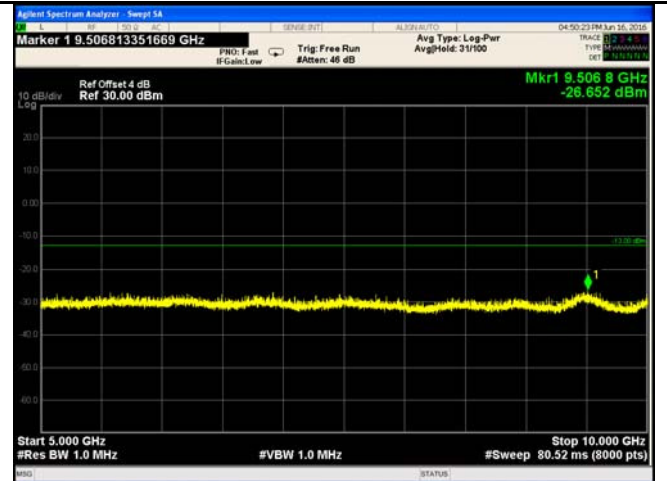
PCS 1900 - High Channel-2

EGPRS (MCS 1):

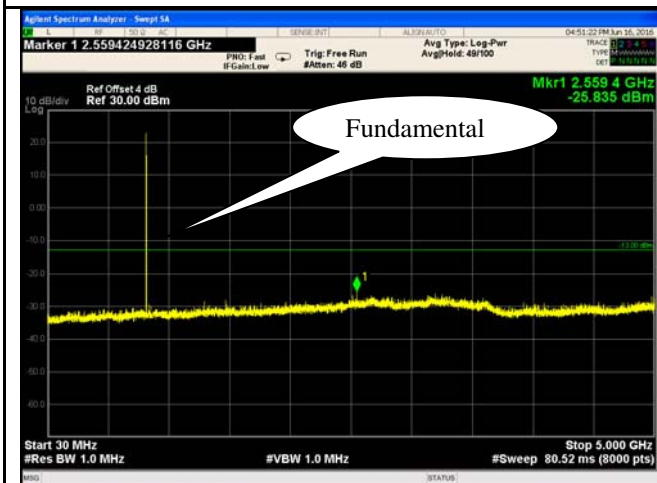
Cellular Band (Part 22H) result



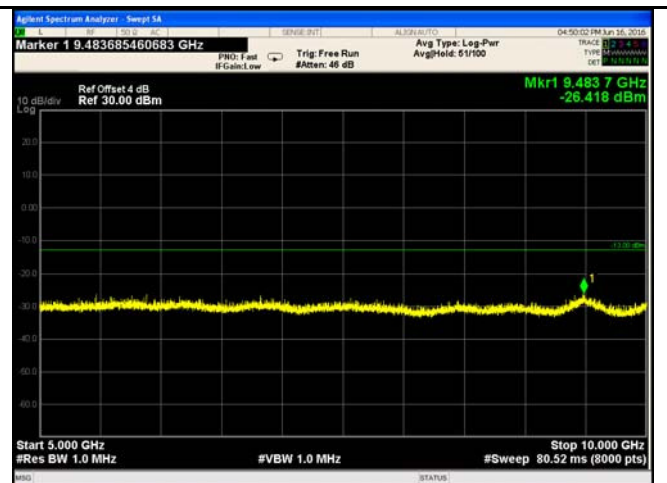
GSM 850 - Low Channel-1



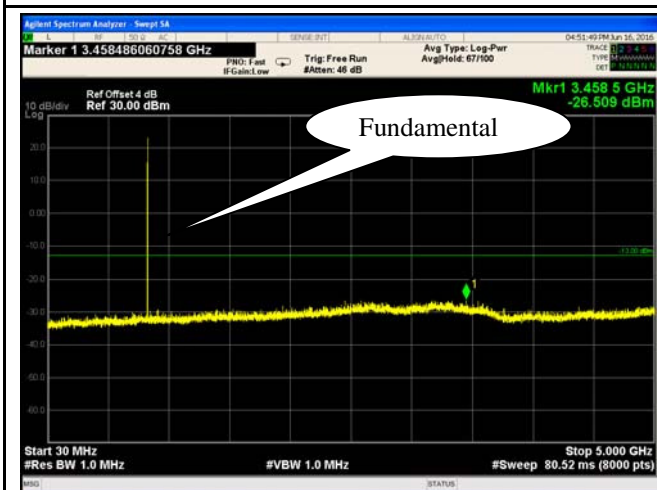
GSM 850 - Low Channel-2



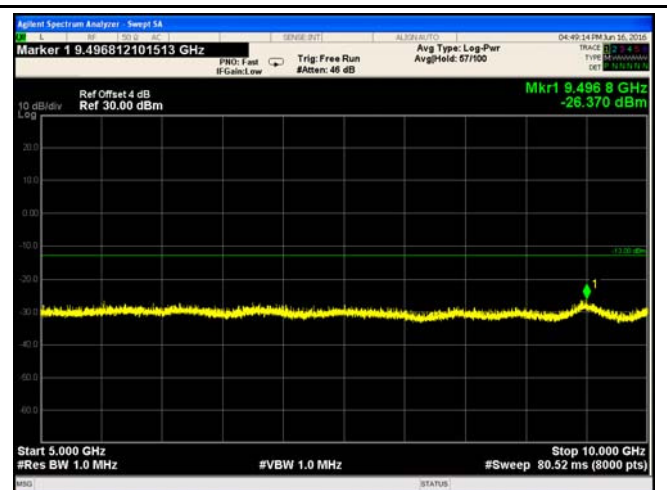
GSM 850 Middle Channel-1



GSM 850 Middle Channel-2

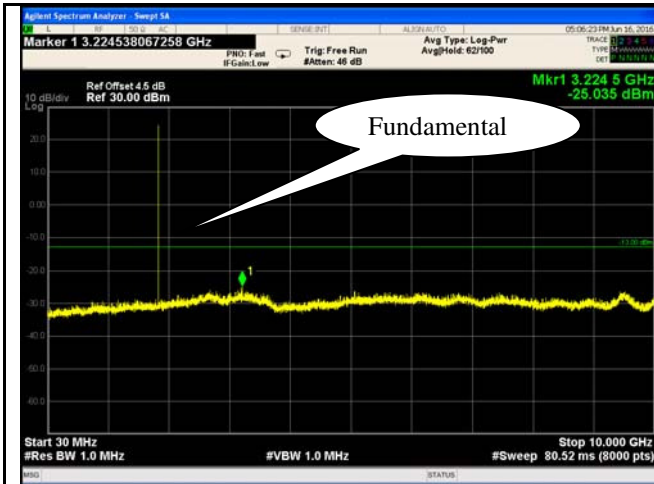


GSM 850 - High Channel-1

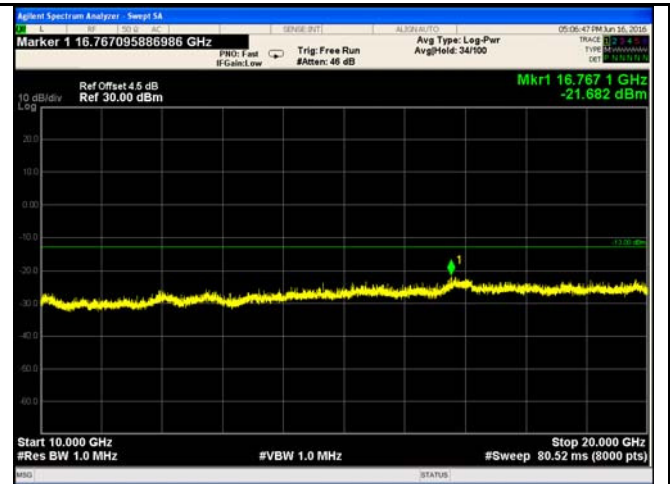


GSM 850 - High Channel-2

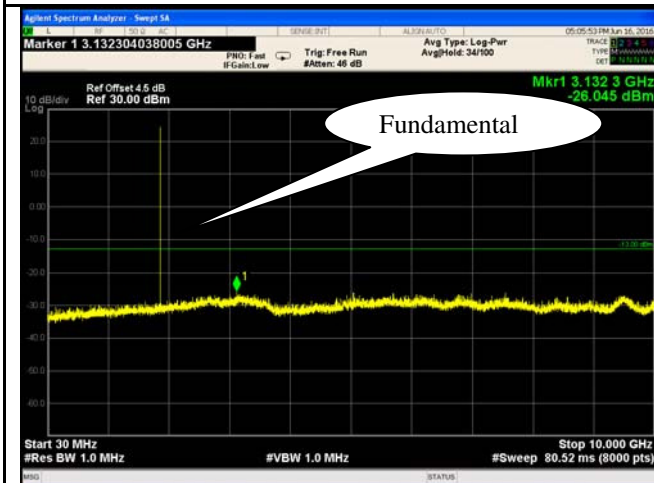
PCS Band (Part24E) result



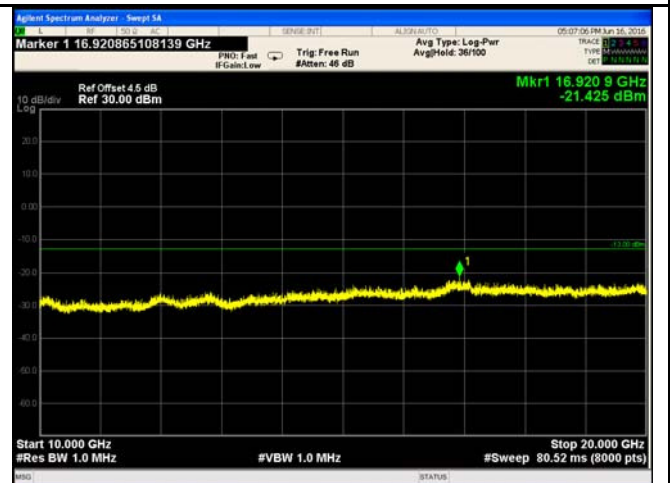
PCS1900 - Low Channel-1



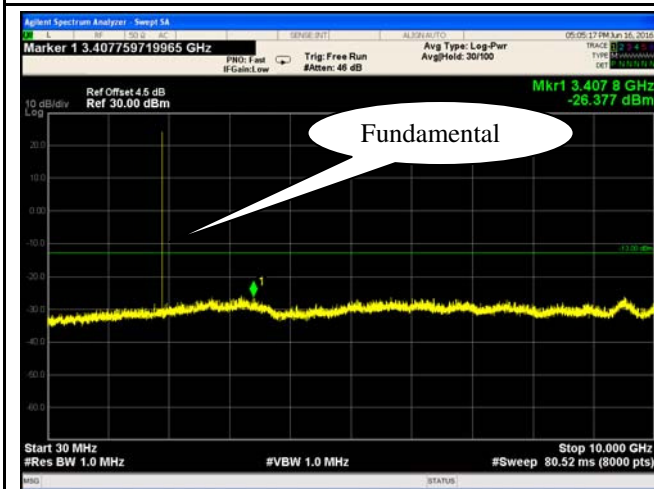
PCS 1900 - Low Channel-2



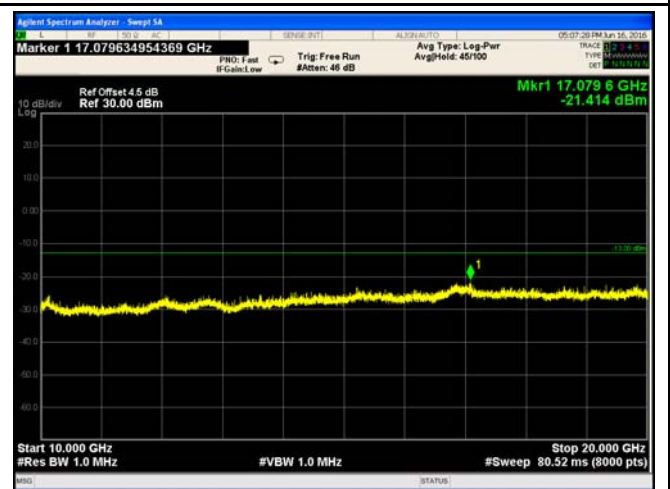
PCS1900 - Middle Channel-1



PCS 1900 - Middle Channel-2



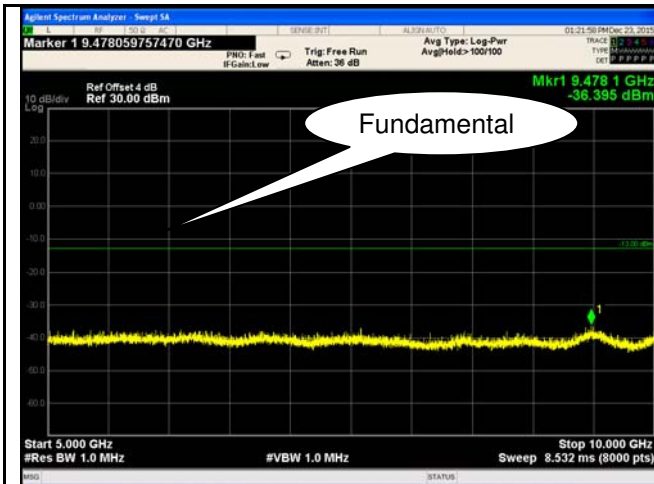
PCS1900 - High Channel-1



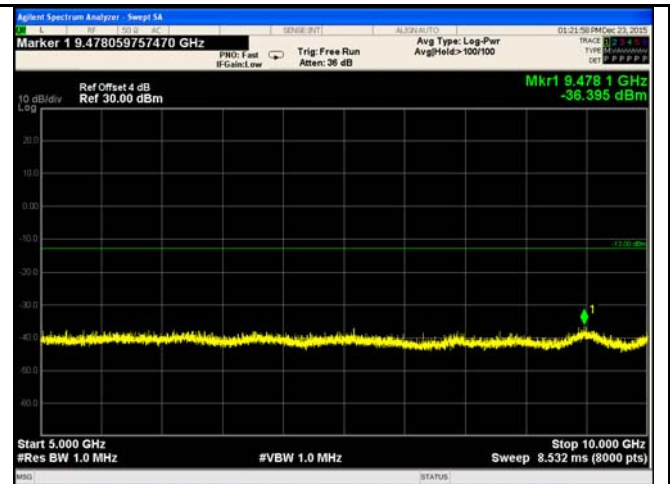
PCS 1900 - High Channel-2

RMC:

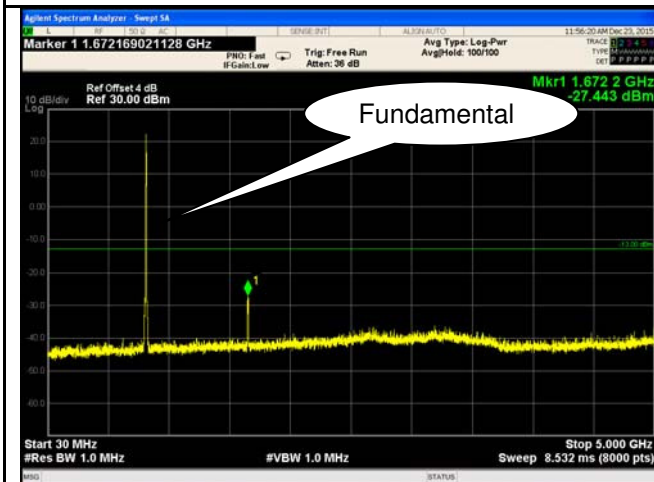
UMTS-FDD Band V (Part 22H)



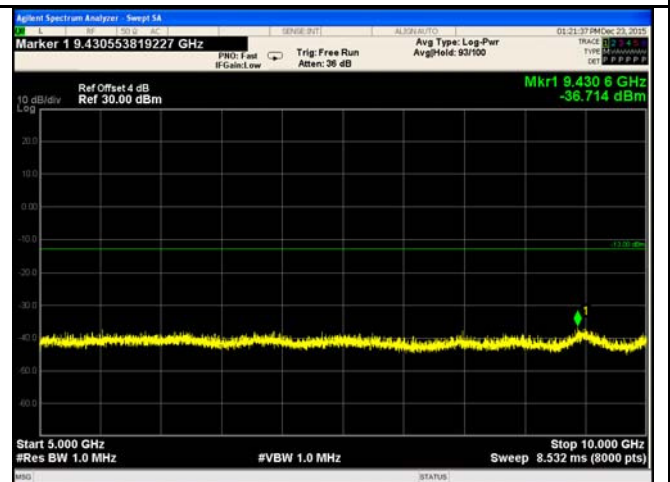
Band V - Low Channel-1



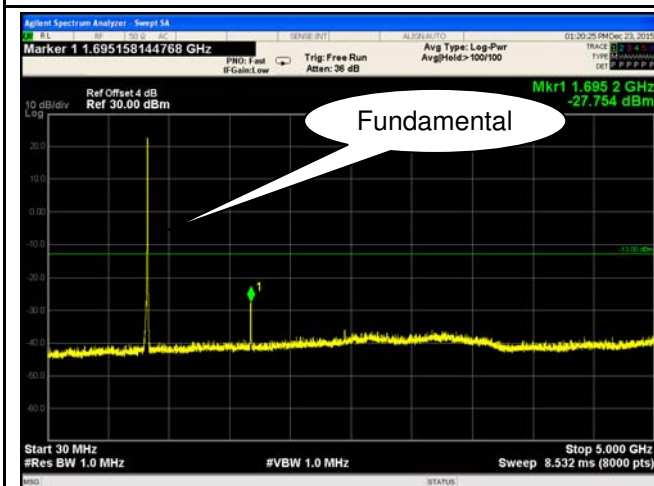
Band V - Low Channel-2



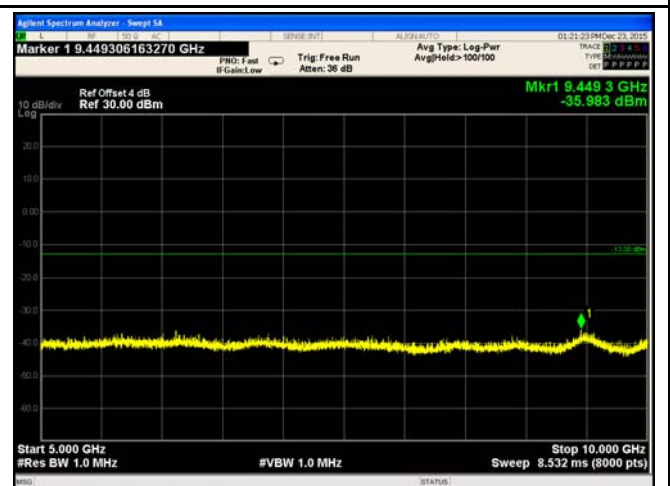
Band V - Middle Channel-1



Band V - Middle Channel-2

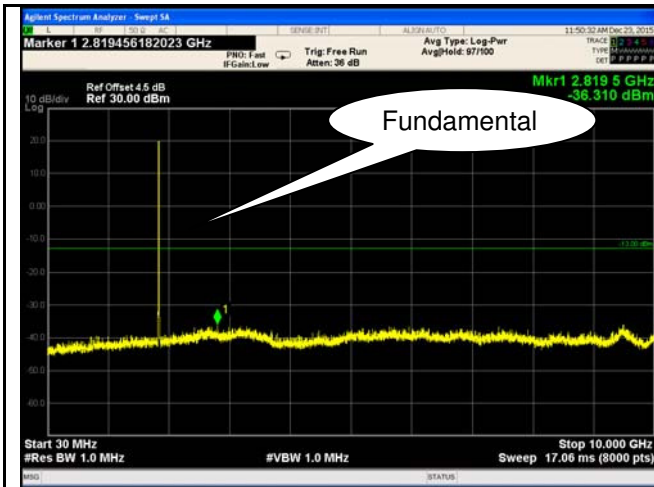


Band V - High Channel-1



Band V - High Channel-2

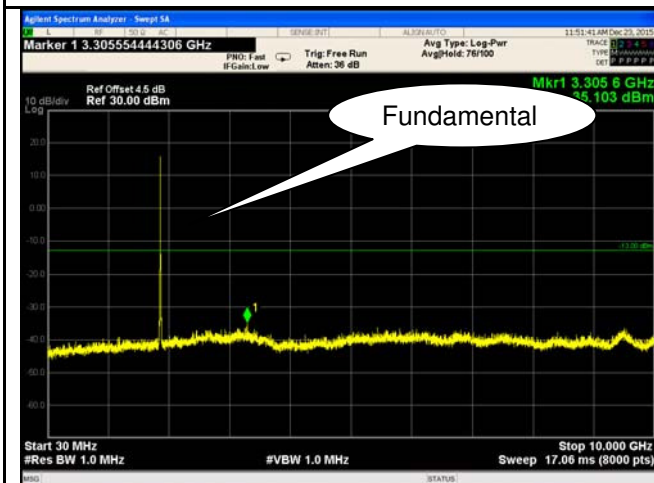
UMTS-FDD Band II (Part 24E)



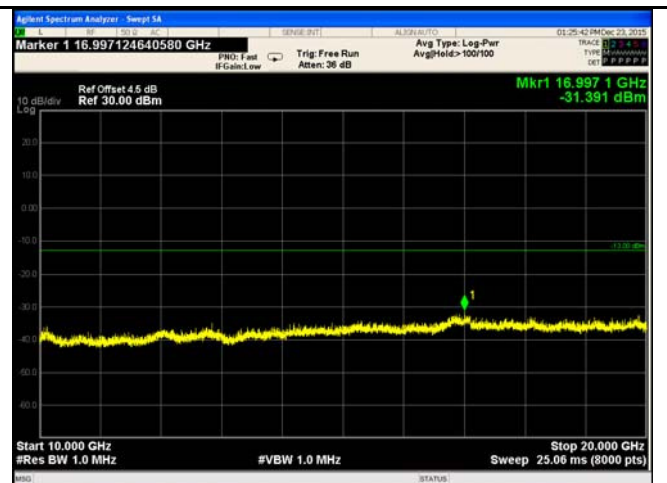
Band II - Low Channel-1



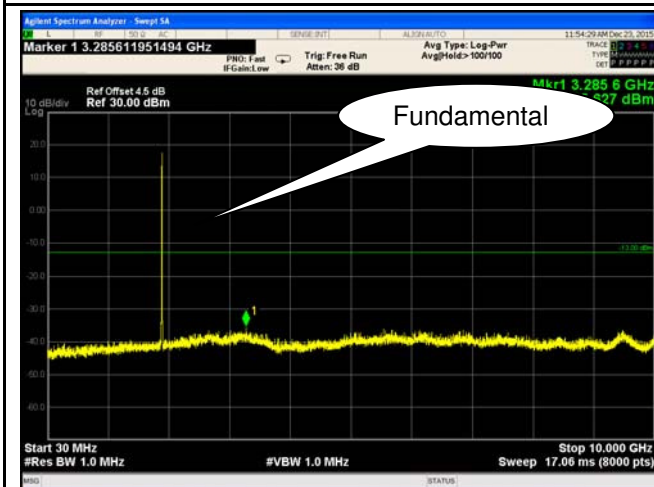
Band II - Low Channel-2



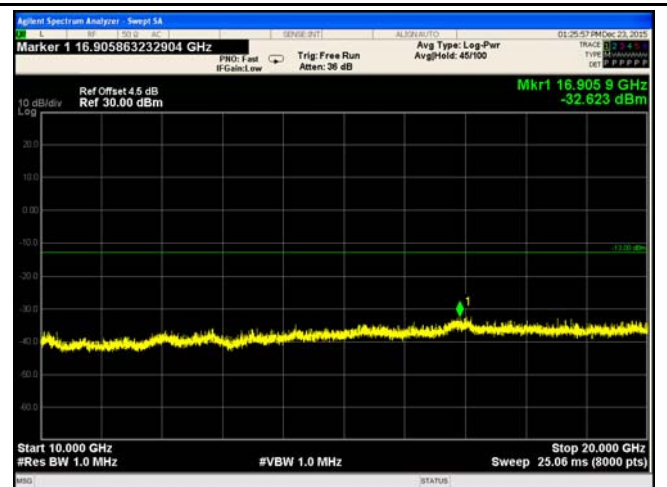
Band II - Middle Channel-1



Band II - Middle Channel-2



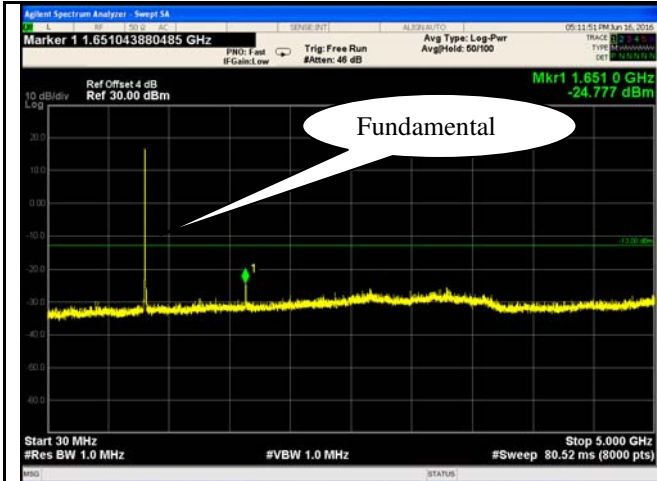
Band II - High Channel-1



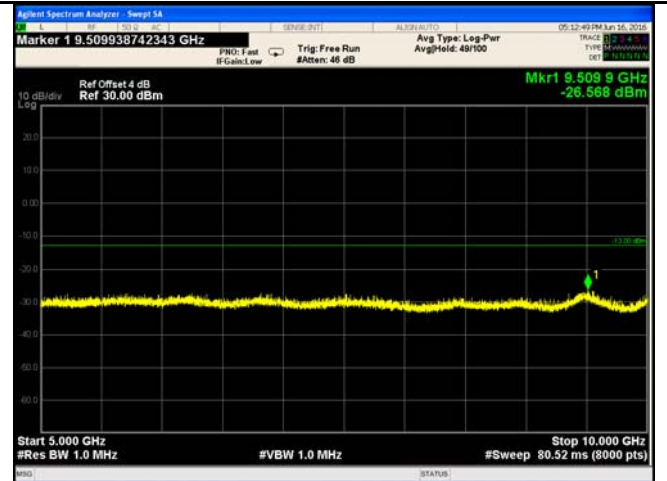
Band II - High Channel-2

HSUPA:

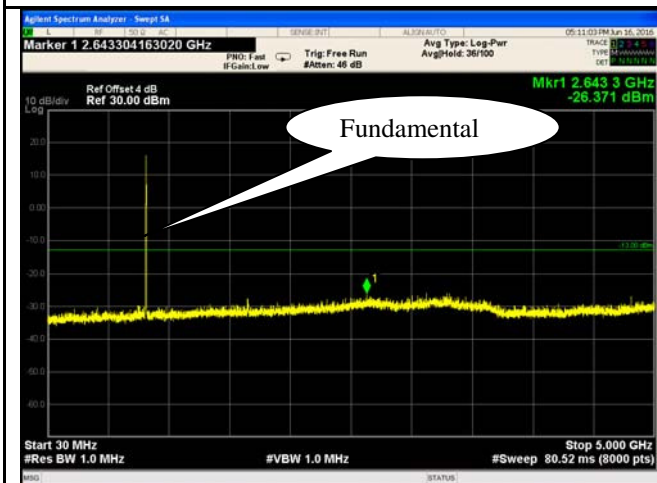
UMTS-FDD Band V (Part 22H)



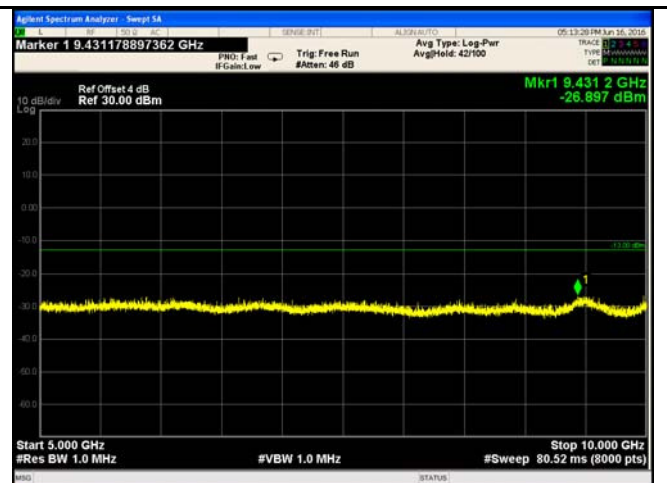
Band V - Low Channel-1



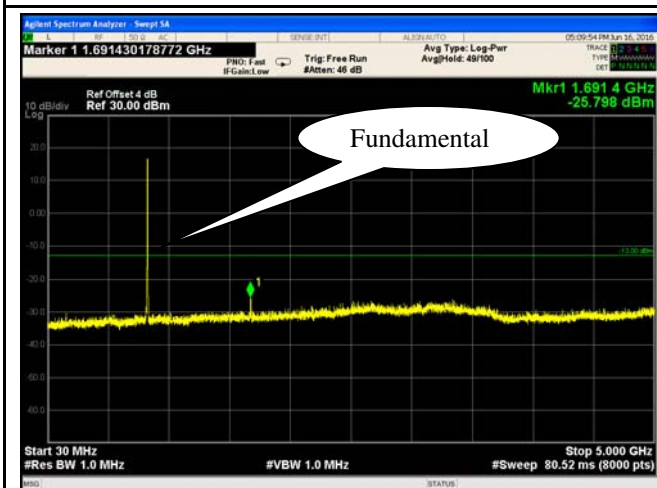
Band V - Low Channel-2



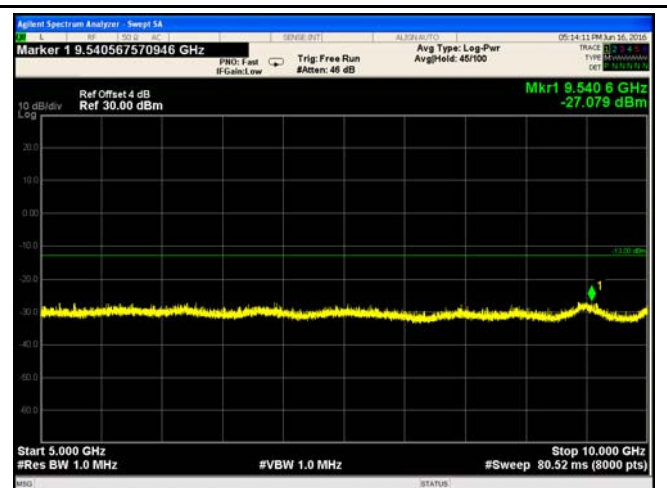
Band V - Middle Channel-1



Band V - Middle Channel-2

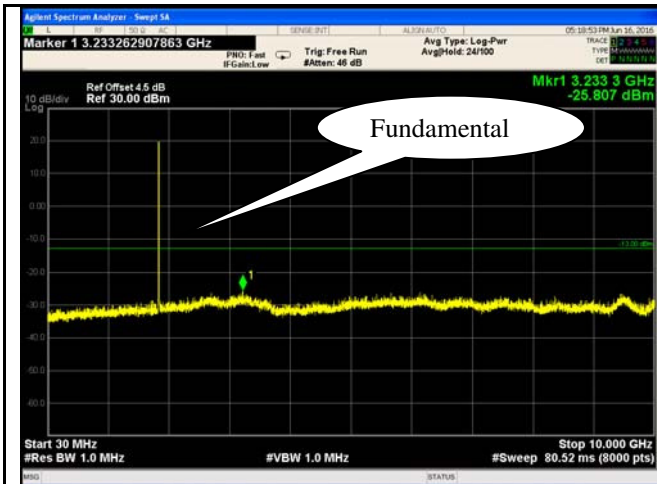


Band V - High Channel-1



Band V - High Channel-2

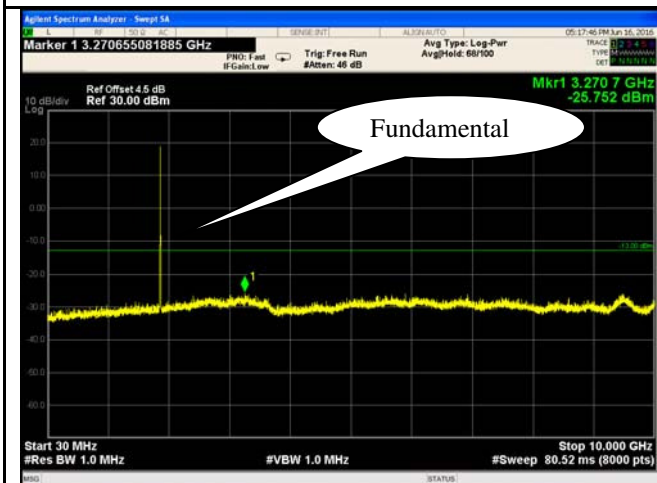
UMTS-FDD Band II (Part 24E)



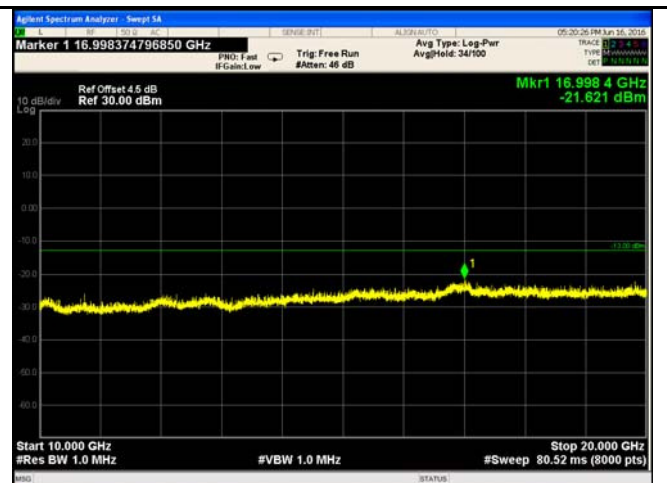
Band II - Low Channel-1



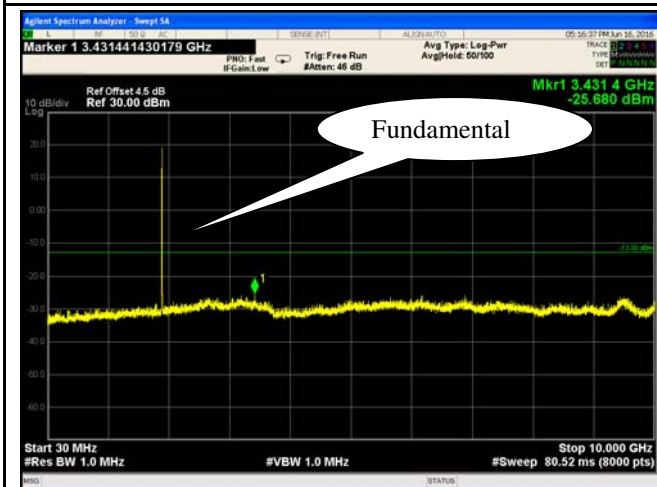
Band II - Low Channel-2



Band II - Middle Channel-1



Band II - Middle Channel-2



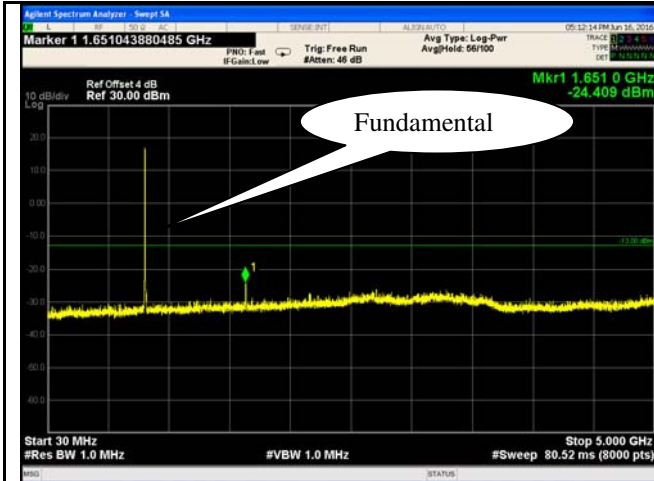
Band II - High Channel-1



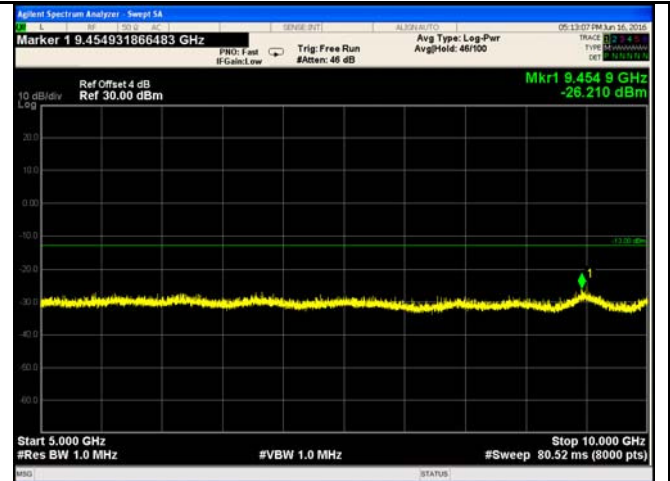
Band II - High Channel-2

HSDPA:

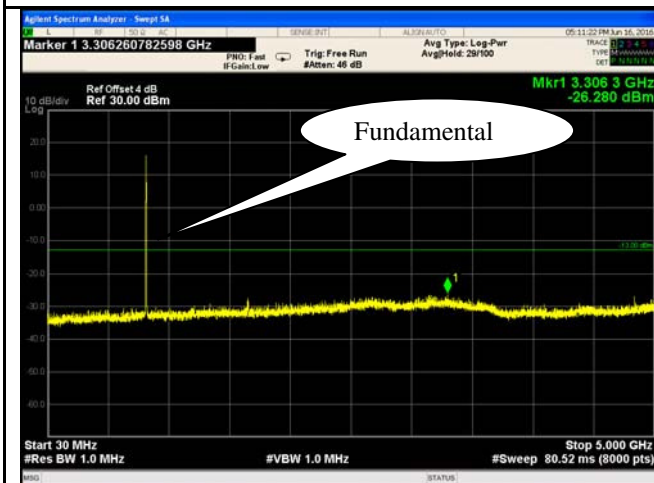
UMTS-FDD Band V (Part 22H)



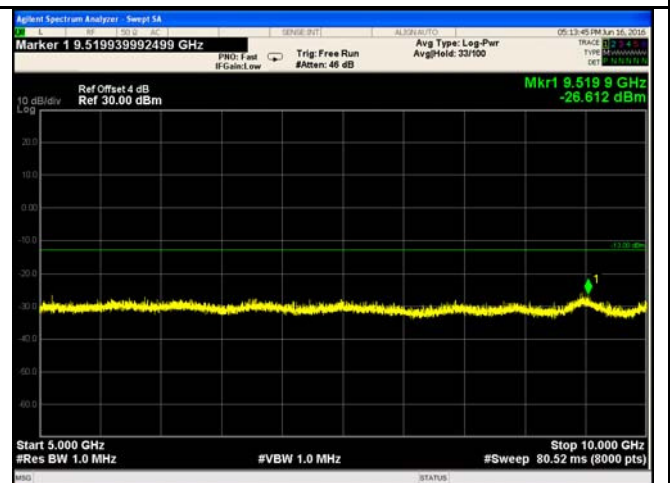
Band V - Low Channel-1



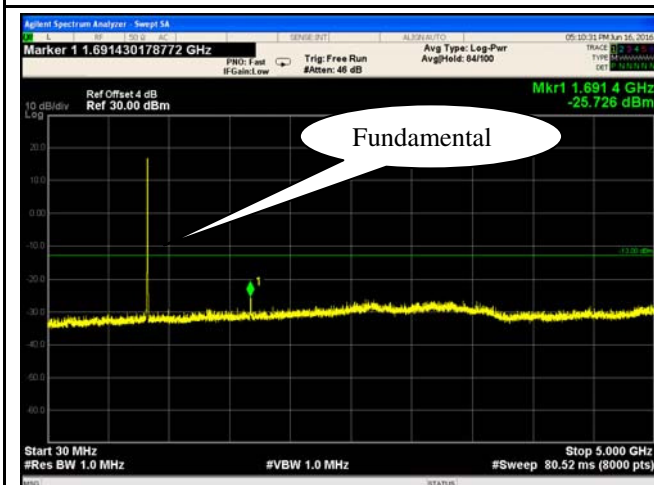
Band V - Low Channel-2



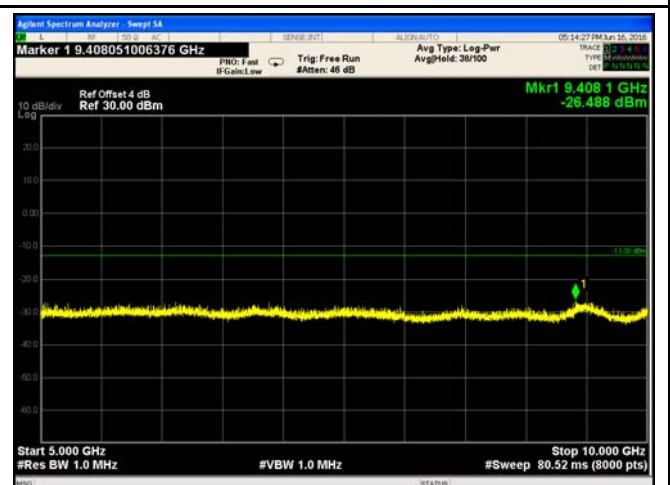
Band V - Middle Channel-1



Band V - Middle Channel-2

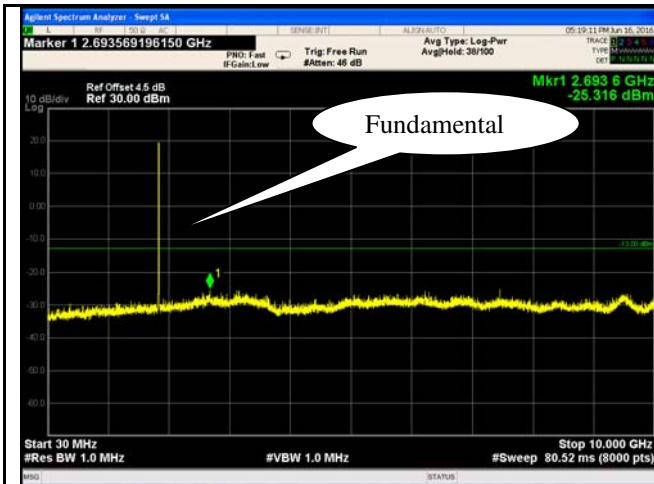


Band V - High Channel-1

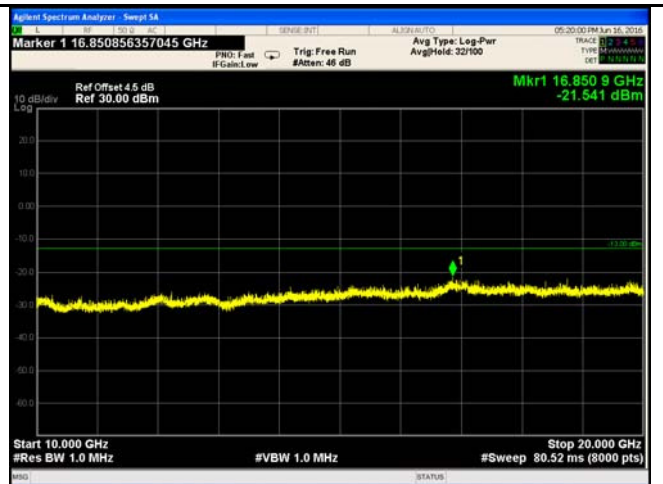


Band V - High Channel-2

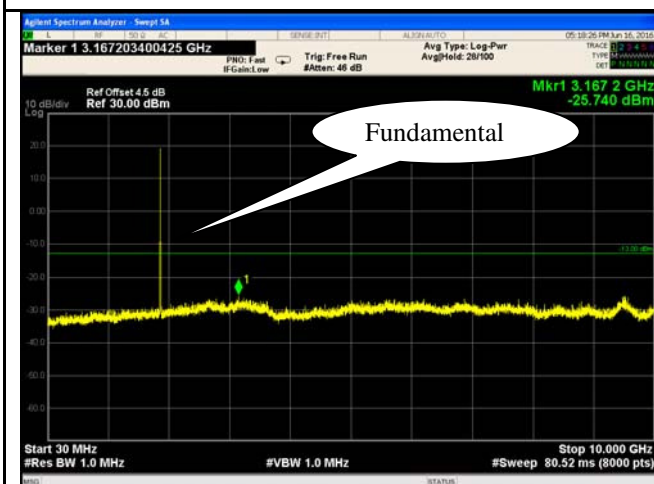
UMTS-FDD Band II (Part 24E)



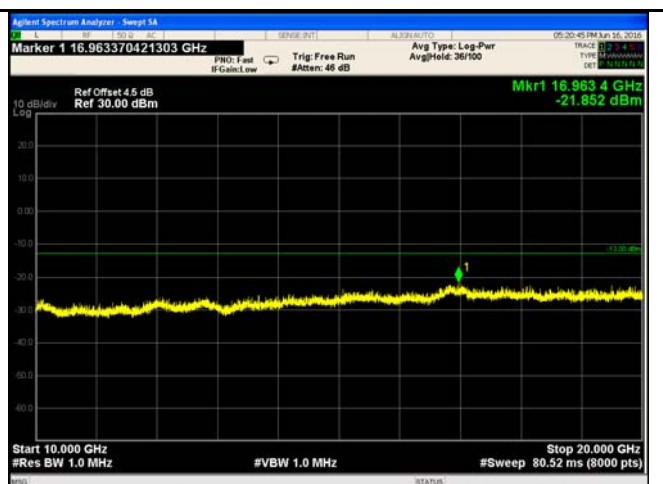
Band II - Low Channel-1



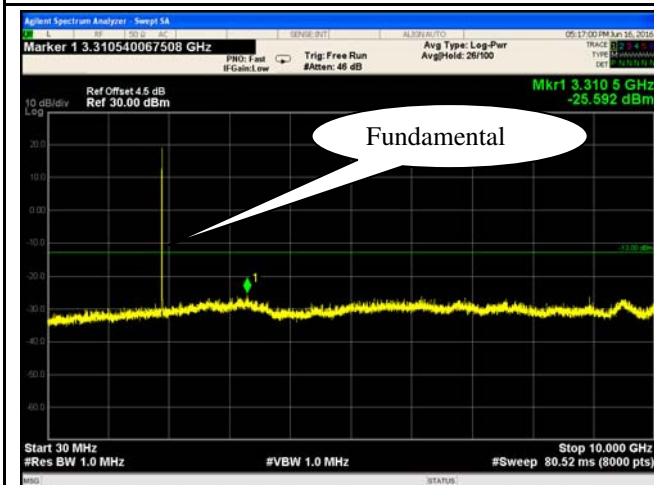
Band II - Low Channel-2



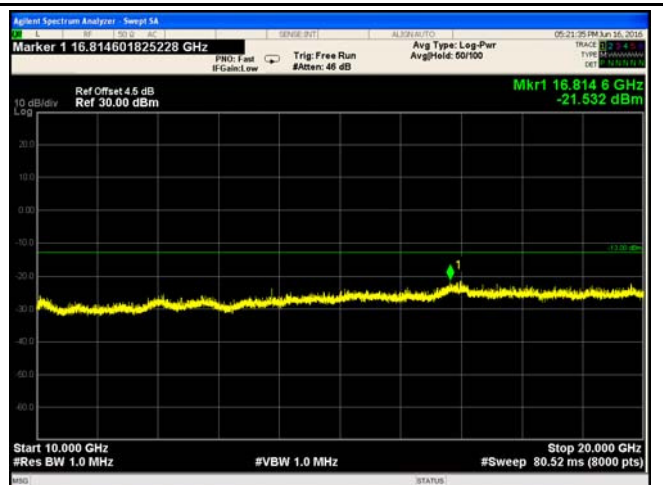
Band II - Middle Channel-1



Band II - Middle Channel-2



Band II - High Channel-1



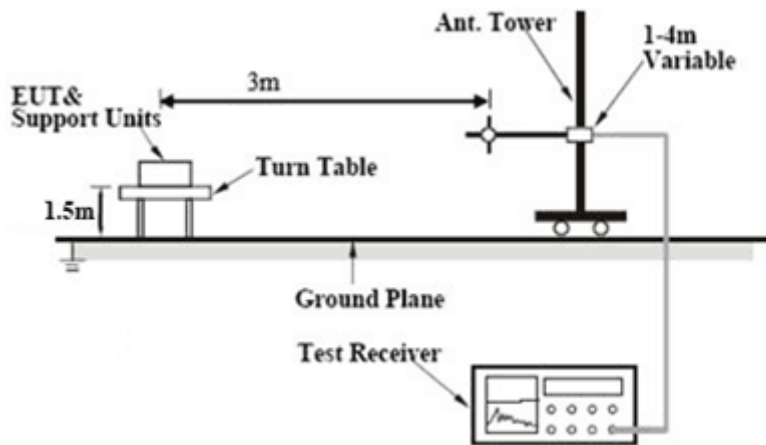
Band II - High Channel-2

6.6 Spurious Radiated Emissions

Temperature	23°C
Relative Humidity	55%
Atmospheric Pressure	1003mbar
Test date :	December 11, 2015&June 16, 2016
Tested By :	Winnie Zhang& Loren Luo

Requirement(s):

Spec	Item	Requirement	Applicable
§2.1053, §22.917 & §24.238	a)	The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.	☒

Test setup	
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Test Procedure	- The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable. - The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis. - Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution. Sample Calculation: EUT Field Strength = Raw Amplitude (dBμV/m) – Amplifier Gain (dB) + Antenna Factor (dB) + Cable Loss (dB) + Filter Attenuation (dB, if used)
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Remark	
Result	☒ Pass ☐ Fail

Test Data ☒ Yes ☐ N/A

Test Plot ☐ Yes (See below) ☒ N/A

Cellular Band (Part 22H) result

Low channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1648.4	-44.83	V	7.95	0.78	-37.66	-13	-24.66
1648.4	-45.18	H	7.95	0.78	-38.01	-13	-25.01
135.2	-46.24	V	0.85	0.19	-45.58	-13	-32.58
329.7	-51.77	H	6.7	0.28	-45.35	-13	-32.35

Middle channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1673.2	-44.76	V	7.95	0.78	-37.59	-13	-24.59
1673.2	-45.08	H	7.95	0.78	-37.91	-13	-24.91
135.6	-46.15	V	0.85	0.19	-45.49	-13	-32.49
329.3	-51.69	H	6.7	0.28	-45.27	-13	-32.27

High channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1697.6	-44.82	V	7.95	0.78	-37.65	-13	-24.65
1697.6	-45.11	H	7.95	0.78	-37.94	-13	-24.94
135.8	-46.25	V	0.85	0.19	-45.59	-13	-32.59
329.4	-51.78	H	6.7	0.28	-45.36	-13	-32.36

Note:

1, The testing has been conformed to $10 \times 848.8 \text{ MHz} = 8,488 \text{ MHz}$

2, All other emissions more than 30 dB below the limit

3, GSM voice, GPRS and EGPRS mode were investigated. The results above show only the worse cases

4, X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

PCS Band (Part24E) result

Low channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3700.4	-45.61	V	10.25	2.73	-38.09	-13	-25.09
3700.4	-46.25	H	10.25	2.73	-38.73	-13	-25.73
136.1	-46.83	V	0.85	0.19	-46.17	-13	-33.17
328.5	-52.55	H	6.7	0.28	-46.13	-13	-33.13

Middle channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3760	-45.58	V	10.25	2.73	-38.06	-13	-25.06
3760	-46.32	H	10.25	2.73	-38.8	-13	-25.8
136.5	-46.79	V	0.85	0.19	-46.13	-13	-33.13
328.7	-52.47	H	6.7	0.28	-46.05	-13	-33.05

High channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3819.6	-45.62	V	10.36	2.73	-37.99	-13	-24.99
3819.6	-46.29	H	10.36	2.73	-38.66	-13	-25.66
136.7	-46.71	V	0.85	0.19	-46.05	-13	-33.05
328.4	-52.38	H	6.7	0.28	-45.96	-13	-32.96

Note:

- 1, The testing has been conformed to $10 \times 1909.8 \text{ MHz} = 19,098 \text{ MHz}$
- 2, All other emissions more than 30 dB below the limit
- 3, GSM voice, GPRS and EGPRS mode were investigated. The results above show only the worse cases
- 4, X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

UMTS-FDD Band V (Part 22H)

Low channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1652.8	-45.68	V	7.95	0.78	-38.51	-13	-25.51
1652.8	-45.81	H	7.95	0.78	-38.64	-13	-25.64
135.5	-46.25	V	0.85	0.19	-45.59	-13	-32.59
329.3	-52.33	H	6.7	0.28	-45.91	-13	-32.91

Middle channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1670	-45.62	V	7.95	0.78	-38.45	-13	-25.45
1670	-45.76	H	7.95	0.78	-38.59	-13	-25.59
135.8	-46.31	V	0.85	0.19	-45.65	-13	-32.65
329.6	-52.24	H	6.7	0.28	-45.82	-13	-32.82

High channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
1693.2	-45.56	V	7.95	0.78	-38.39	-13	-25.39
1693.2	-45.71	H	7.95	0.78	-38.54	-13	-25.54
135.9	-46.28	V	0.85	0.19	-45.62	-13	-32.62
329.1	-52.17	H	6.7	0.28	-45.75	-13	-32.75

Note:

- 1, The testing has been conformed to $10 \times 846.6 \text{ MHz} = 8,466 \text{ MHz}$
- 2, All other emissions more than 30 dB below the limit
- 3, RMC, HSUPA and HSDPA mode were investigated. The results above show only the worse cases
- 4, X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

UMTS-FDD Band II (Part 24E)

Low channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3704.8	-47.49	V	10.25	2.73	-39.97	-13	-26.97
3704.8	-47.82	H	10.25	2.73	-40.3	-13	-27.3
136.4	-47.35	V	0.85	0.19	-46.69	-13	-33.69
328.3	-52.71	H	6.7	0.28	-46.29	-13	-33.29

Middle channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3760	-47.43	V	10.25	2.73	-39.91	-13	-26.91
3760	-47.76	H	10.25	2.73	-40.24	-13	-27.24
136.9	-47.22	V	0.85	0.19	-46.56	-13	-33.56
328.6	-52.65	H	6.7	0.28	-46.23	-13	-33.23

High channel

Frequency (MHz)	Substituted level (dBm)	Polarity (H/V)	Antenna Gain Correction (dB)	Cable Loss (dB)	Corrected Reading (dBm)	Limit (dBm)	Margin (dB)
3815.2	-47.38	V	10.36	2.73	-39.75	-13	-26.75
3815.2	-47.64	H	10.36	2.73	-40.01	-13	-27.01
136.7	-47.15	V	0.85	0.19	-46.49	-13	-33.49
328.4	-52.58	H	6.7	0.28	-46.16	-13	-33.16

Note:

1, The testing has been conformed to $10 \times 1907.6 \text{ MHz} = 19,076 \text{ MHz}$

2, All other emissions more than 30 dB below the limit

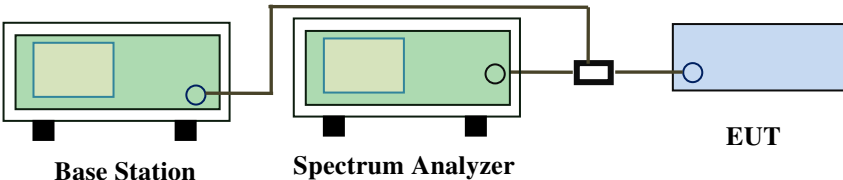
3, RMC, HSUPA and HSDPA mode were investigated. The results above show only the worse cases

4, X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case

6.7 Band Edge

Temperature	23°C
Relative Humidity	55%
Atmospheric Pressure	1003mbar
Test date :	December 21, 2015&June 16, 2016
Tested By :	Winnie Zhang& Loren Luo

Requirement(s):

Spec	Item	Requirement	Applicable
§22.917(a) §24.238(a)	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

GSM Voice:

Cellular Band (Part 22H) result

Frequency (MHz)	Emission (dBm)	Limit (dBm)
823.996	-17.639	-13
849.018	-16.795	-13

PCS Band (Part24E) result

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1849.999	-19.501	-13
1910.018	-18.433	-13

GPRS:

Cellular Band (Part 22H) result

Frequency (MHz)	Emission (dBm)	Limit (dBm)
823.9925	-17.283	-13
849.0050	-19.417	-13

PCS Band (Part24E) result

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1849.9975	-18.295	-13
1910.0050	-19.459	-13

EGPRS (MCS1):

Cellular Band (Part 22H) result

Frequency (MHz)	Emission (dBm)	Limit (dBm)
823.9975	-15.216	-13
849.0025	-15.505	-13

PCS Band (Part24E) result

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1849.9750	-19.885	-13
1910.0125	-20.103	-13

RMC:

UMTS-FDD Band V (Part 22H)

Frequency (MHz)	Emission (dBm)	Limit (dBm)
823.90	-22.950	-13
849.05	-23.978	-13

UMTS-FDD Band II (Part 24E)

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1848.63	-17.903	-13
1911.10	-21.646	-13

HSUPA:

UMTS-FDD Band V (Part 22H)

Frequency (MHz)	Emission (dBm)	Limit (dBm)
823.925	-32.332	-13
849.875	-27.174	-13

UMTS-FDD Band II (Part 24E)

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1849.875	-19.251	-13
1910.100	-20.513	-13

HSDPA:

UMTS-FDD Band V (Part 22H)

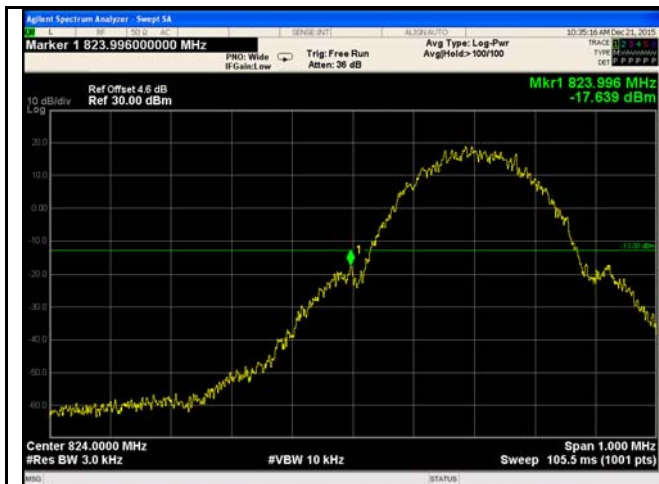
Frequency (MHz)	Emission (dBm)	Limit (dBm)
823.575	-34.058	-13
849.075	-27.407	-13

UMTS-FDD Band II (Part 24E)

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1849.650	-20.489	-13
1910.075	-20.241	-13

GSM Voice:

Test Plots



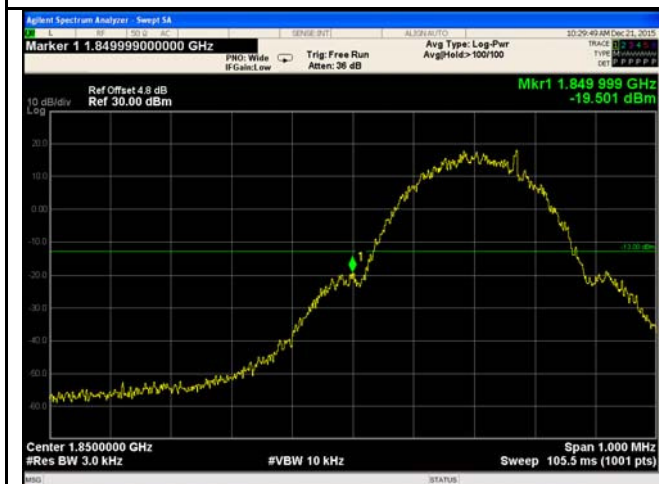
Cellular Band - Low Channel

Note: Offset=Cable loss (4.0) + 10log
(3.45/3)=4.0+0.6=4.6 dB



Cellular Band - High Channel

Note: Offset=Cable loss (4.0) + 10log
(3.38/3)=4.0+0.5=4.5 dB



PCS Band - Low Channel

Note: Offset=Cable loss (4.5) + 10log
(3.19/3)=4.5+0.3=4.8dB

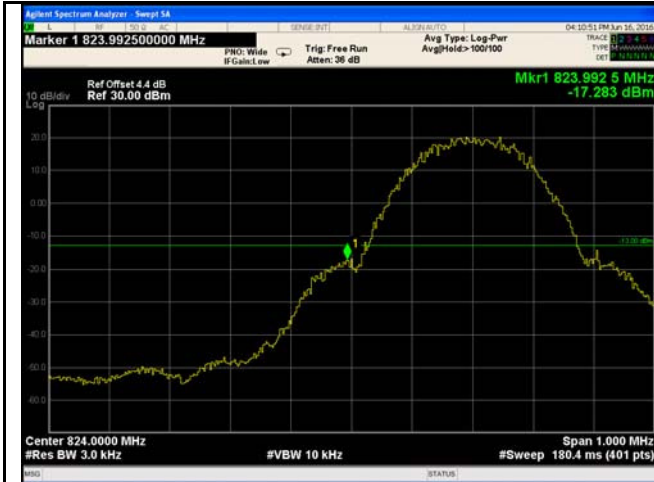


PCS Band - High Channel

Note: Offset=Cable loss (4.5) + 10log
(3.23/3)=4.5+0.3=4.8 dB

GPRS:

Test Plots



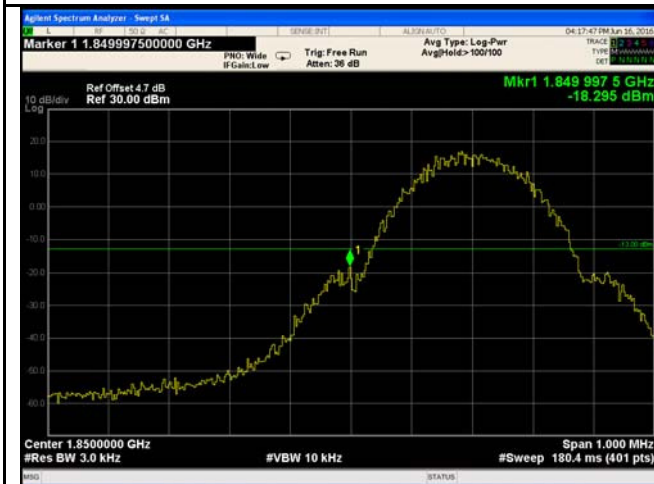
Cellular Band - Low Channel

Note: Offset=Cable loss (4.0) + 10log
(3.28/3)=4.0+0.4=4.4dB



Cellular Band - High Channel

Note: Offset=Cable loss (4.0) + 10log
(3.4/3)=4.0+0.2=4.2dB



PCS Band - Low Channel

Note: Offset=Cable loss (4.5) + 10log
(3.11/3)=4.5+0.2=4.7dB

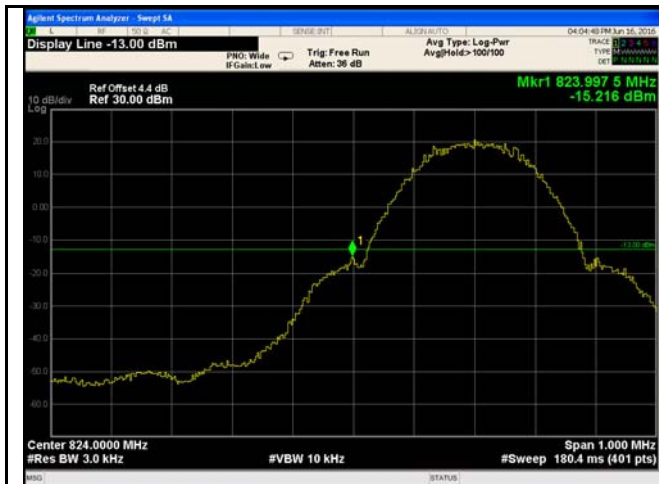


PCS Band - High Channel

Note: Offset=Cable loss (4.5) + 10log
(3.15/3)=4.5+0.2=4.7dB

EGPRS (MCS1):

Test Plots



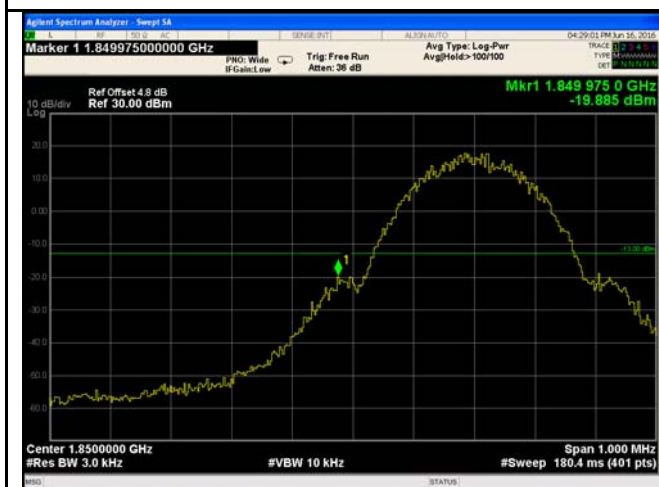
Cellular Band - Low Channel

Note: Offset=Cable loss (4.0) + 10log
(3.25/3)=4.0+0.4=4.4dB



Cellular Band - High Channel

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



PCS Band - Low Channel

Note: Offset=Cable loss (4.5) + 10log
(3.18/3)=4.5+0.3=4.8dB



PCS Band - High Channel

Note: Offset=Cable loss (4.5) + 10log
(3.23/3)=4.5+0.3=4.8dB

RMC:



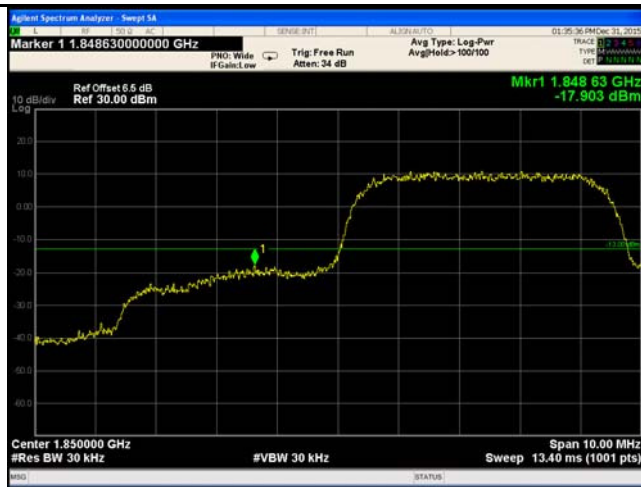
UMTS-FDD Band V - Low Channel

Note: Offset=Cable loss (4.0) + 10log
(46.84/30)=4.0+1.9=5.9 dB



UMTS-FDD Band V - High Channel

Note: Offset=Cable loss (4.0) + 10log
(46.83/30)=4.0+1.9=5.9 dB



UMTS-FDD Band II - Low Channel

Note: Offset=Cable loss (4.5) + 10log
(47.55/30)=4.5+2.0=6.5 dB



UMTS-FDD Band II - High Channel

Note: Offset=Cable loss (4.5) + 10log
(47.61/30)=4.5+2.0=6.5 dB

HSUPA:



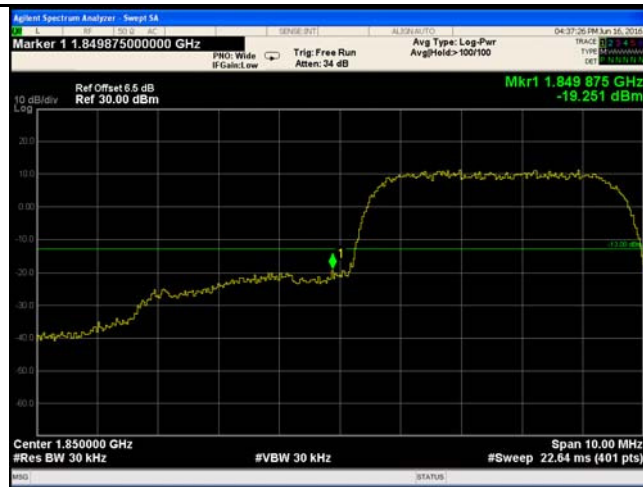
UMTS-FDD Band V - Low Channel

Note: Offset=Cable loss (4.0) + 10log
(46.9/30)=4.0+1.9=5.9 dB



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
(47.24/30)=4.0+2.0=6.5 dB



UMTS-FDD Band II - High Channel

Note: Offset=Cable loss (4.5) + 10log
(47.72/30)=4.0+2.0=6.5 dB

HSDPA:



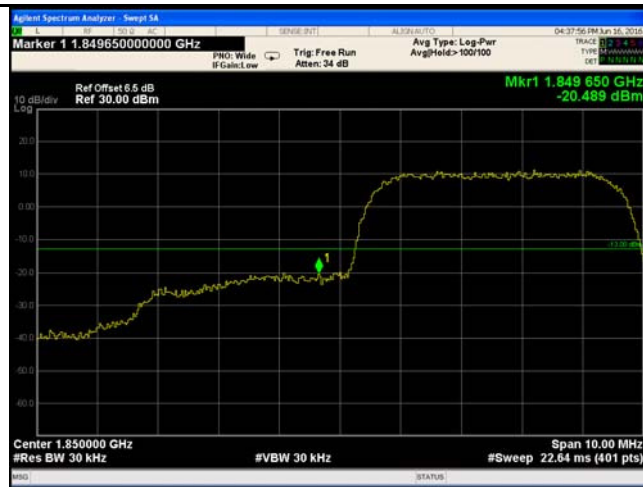
UMTS-FDD Band V - Low Channel

Note: Offset=Cable loss (4.0) + 10log
(46.94/30)=4.0+1.9=5.9 dB



UMTS-FDD Band V - High Channel

Note: Offset=Cable loss (4.0) + 10log
(46.89/30)=4.0+1.9=5.9 dB



UMTS-FDD Band II - Low Channel

Note: Offset=Cable loss (4.5) + 10log
(47.3/30)=4.5+2.0=6.5 dB



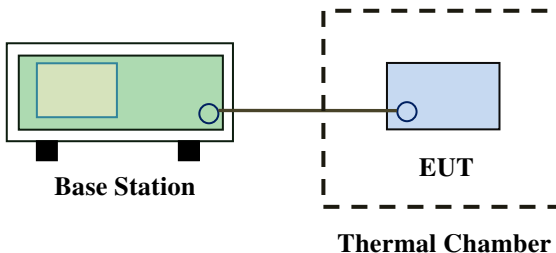
UMTS-FDD Band II - High Channel

Note: Offset=Cable loss (4.5) + 10log
(47.78/30)=4.5+2.0=6.5 dB

6.8 Frequency Stability

Temperature	23°C
Relative Humidity	55%
Atmospheric Pressure	1003mbar
Test date :	December 12, 2015&June 16, 2016
Tested By :	Winnie Zhang& Loren Luo

Requirement(s):

Spec	Item	Requirement	Applicable																																
§2.1055, §22.355 & §24.235	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>.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 29.</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	.0	821 to 896	1.5	2.5	2.5	928 to 29.	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	.0																																
821 to 896	1.5	2.5	2.5																																
928 to 29.	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 horizontal line connects it to a blue rectangular box labeled 'EUT' (Equipment Under Test). The 'EUT' is enclosed within a dashed-line rectangular box labeled 'Thermal Chamber'.																																		

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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	21	0.0251	2.5
0		22	0.0263	2.5
10		21	0.0251	2.5
20		21	0.0251	2.5
30		17	0.0203	2.5
40		16	0.0191	2.5
50		15	0.0179	2.5
55		25	0.0299	2.5
25	4.2	20	0.0239	2.5
	3.5	21	0.0251	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	21	0.0112	2.5
0		22	0.0117	2.5
10		17	0.0090	2.5
20		15	0.0080	2.5
30		21	0.0112	2.5
40		18	0.0096	2.5
50		23	0.0122	2.5
55		24	0.0128	2.5
25	4.2	21	0.0112	2.5
	3.5	22	0.0117	2.5

GPRS:

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	18	0.0215	2.5
0		22	0.0263	2.5
10		20	0.0239	2.5
20		21	0.0251	2.5
30		15	0.0179	2.5
40		16	0.0191	2.5
50		13	0.0155	2.5
55		22	0.0263	2.5
25	4.2	20	0.0239	2.5
	3.5	12	0.0143	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	18	0.0096	2.5
0		20	0.0106	2.5
10		12	0.0064	2.5
20		15	0.0080	2.5
30		18	0.0096	2.5
40		18	0.0096	2.5
50		21	0.0112	2.5
55		17	0.0090	2.5
25	4.2	22	0.0117	2.5
	3.5	20	0.0106	2.5

EGPRS (MCS1):

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	20	0.0239	2.5
0		18	0.0215	2.5
10		15	0.0179	2.5
20		22	0.0263	2.5
30		13	0.0155	2.5
40		16	0.0191	2.5
50		15	0.0179	2.5
55		20	0.0239	2.5
25	4.2	15	0.0179	2.5
	3.5	11	0.0131	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	15	0.0080	2.5
0		18	0.0096	2.5
10		22	0.0117	2.5
20		15	0.0080	2.5
30		18	0.0096	2.5
40		20	0.0106	2.5
50		22	0.0117	2.5
55		17	0.0090	2.5
25	4.2	22	0.0117	2.5
	3.5	18	0.0096	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	19	0.0228	2.5
0		16	0.0192	2.5
10		16	0.0192	2.5
20		15	0.0180	2.5
30		15	0.0180	2.5
40		13	0.0156	2.5
50		15	0.0180	2.5
55		16	0.0192	2.5
25	4.2	18	0.0216	2.5
	3.5	19	0.0228	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	16	0.0085	2.5
0		16	0.0085	2.5
10		10	0.0053	2.5
20		10	0.0053	2.5
30		12	0.0064	2.5
40		11	0.0059	2.5
50		14	0.0074	2.5
55		11	0.0059	2.5
25	4.2	12	0.0064	2.5
	3.5	13	0.0069	2.5

HSUPA:

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		16	0.0192	2.5
10		16	0.0192	2.5
20		13	0.0156	2.5
30		15	0.0180	2.5
40		12	0.0144	2.5
50		15	0.0180	2.5
55		11	0.0132	2.5
25	4.2	15	0.0180	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	15	0.0080	2.5
0		16	0.0085	2.5
10		12	0.0064	2.5
20		10	0.0053	2.5
30		17	0.0090	2.5
40		11	0.0059	2.5
50		18	0.0096	2.5
55		11	0.0059	2.5
25	4.2	12	0.0064	2.5
	3.5	14	0.0074	2.5

HSDPA:

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	20	0.0240	2.5
0		18	0.0216	2.5
10		16	0.0192	2.5
20		11	0.0132	2.5
30		12	0.0144	2.5
40		15	0.0180	2.5
50		13	0.0156	2.5
55		18	0.0216	2.5
25	4.2	21	0.0251	2.5
	3.5	13	0.0156	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		12	0.0064	2.5
10		17	0.0090	2.5
20		13	0.0069	2.5
30		14	0.0074	2.5
40		10	0.0053	2.5
50		18	0.0096	2.5
55		15	0.0080	2.5
25	4.2	12	0.0064	2.5
	3.5	20	0.0106	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	09/17/2015	09/16/2016	☒
Power Splitter	1#	1#	09/01/2015	08/31/2016	☒
Universal Radio Communication Tester	CMU200	121393	09/25/2015	09/24/2016	☒
Temperature/Humidity Chamber	UHL-270	001	10/09/2015	10/08/2016	☒
DC Power Supply	E3640A	MY40004013	09/17/2015	09/16/2016	☒
Radiated Emissions					
EMI test receiver	ESL6	100262	09/17/2015	09/16/2016	☒
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	09/01/2015	08/31/2016	☒
Microwave Preamplifier (1 ~ 26.5GHz)	8449B	3008A02402	03/25/2015	03/24/2016	☒
Microwave Preamplifier (1 ~ 26.5GHz)	8449B	3008A02402	03/24/2016	03/23/2017	☒
Bilog Antenna (30MHz~6GHz)	JB6	A110712	09/21/2015	09/20/2016	☒
Bilog Antenna (30MHz~2GHz)	JB1	A112017	09/21/2015	09/20/2016	☒
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71259	09/24/2015	09/23/2016	☒
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	09/24/2015	09/23/2016	☒
SYNTHESIZED SIGNAL GENERATOR	8665B	3744A01293	09/17/2015	09/16/2016	☒
Tunable Notch Filter	3NF-800/1000-S	AA4	09/01/2015	08/31/2016	☒
Tunable Notch Filter	3NF-1000/2000-S	AM 4	09/01/2015	08/31/2016	☒

Annex B. EUT And Test Setup Photographs

Annex B.i. Photograph: EUT External Photo

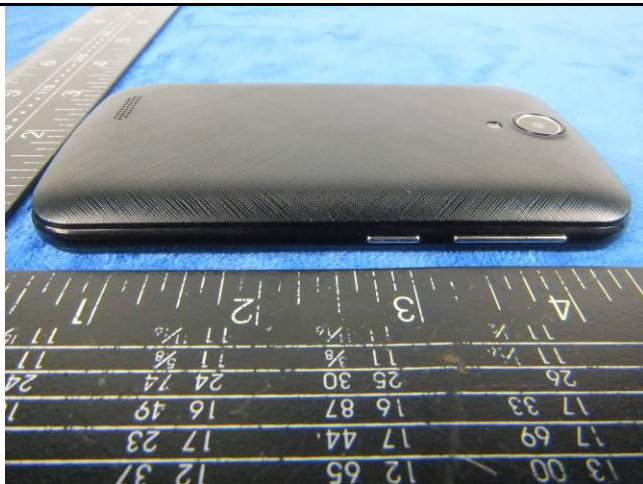




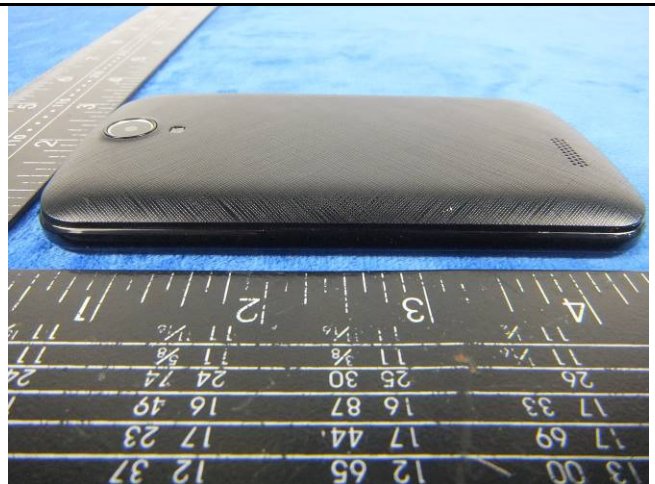
EUT - Top View



EUT - Bottom View



EUT - Left View



EUT - Right View

Annex B.ii. Photograph: EUT Internal Photo



Cover Off - Top View 1



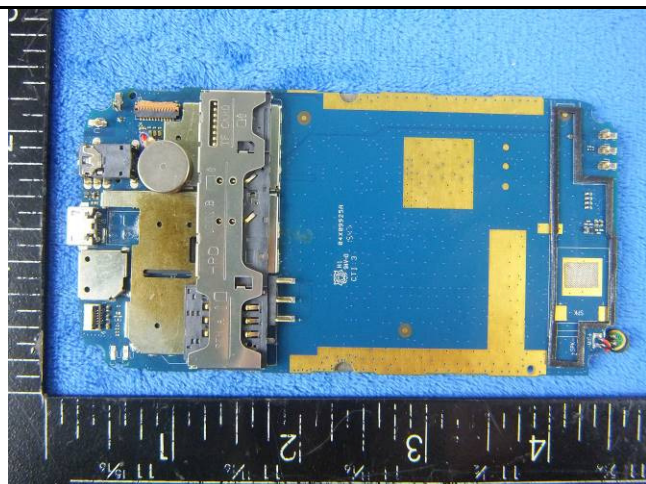
Cover Off - Top View 2



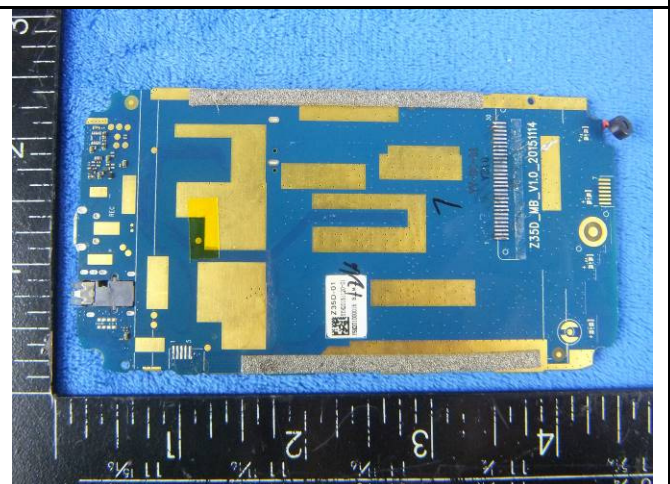
Battery - Front View



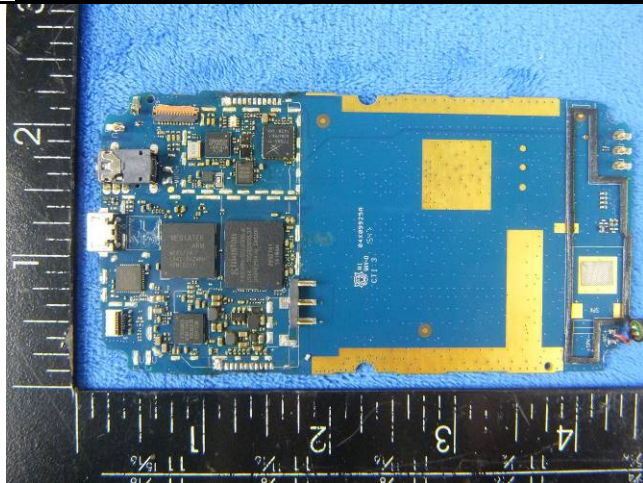
Battery - Rear View



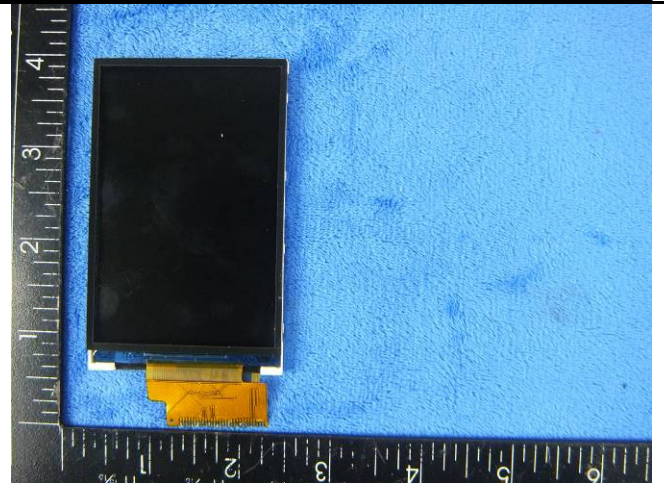
Mainboard with Shielding - Front View



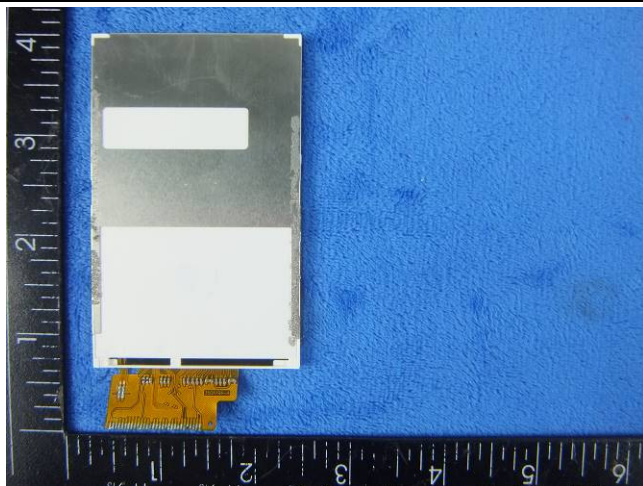
Mainboard with Shielding - Rear View



Mainboard without shielding - Front View



LCD - Front View



LCD - Rear View

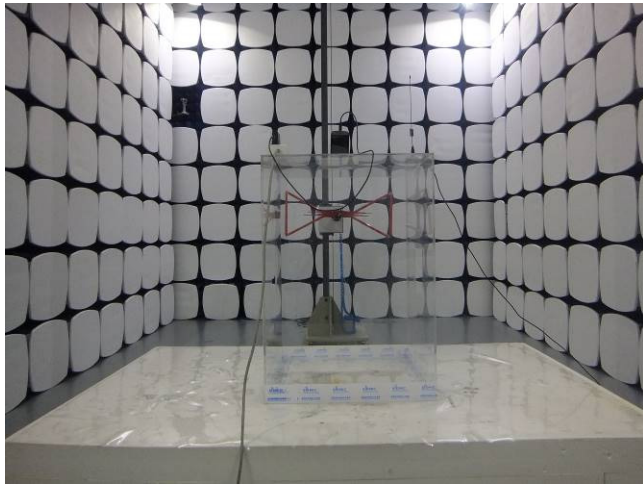


GSM/PCS/UMTS-FDD - Antenna View

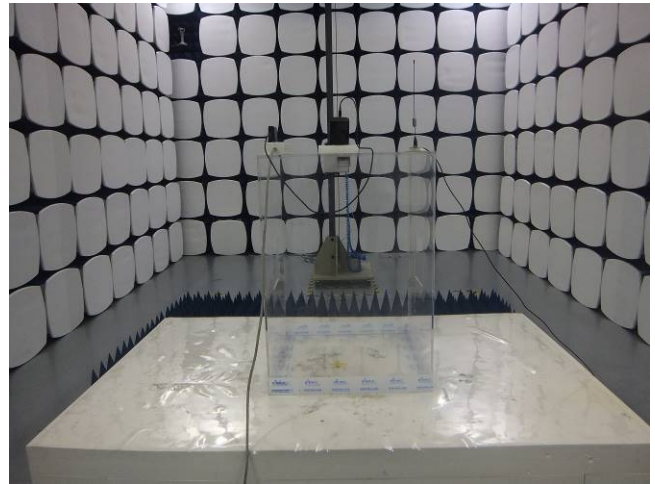


WIFI/BT/BLE/GPS - Antenna View

Annex B.iii. Photograph: Test Setup Photo



Radiated Spurious Emissions Test Setup Below 1GHz

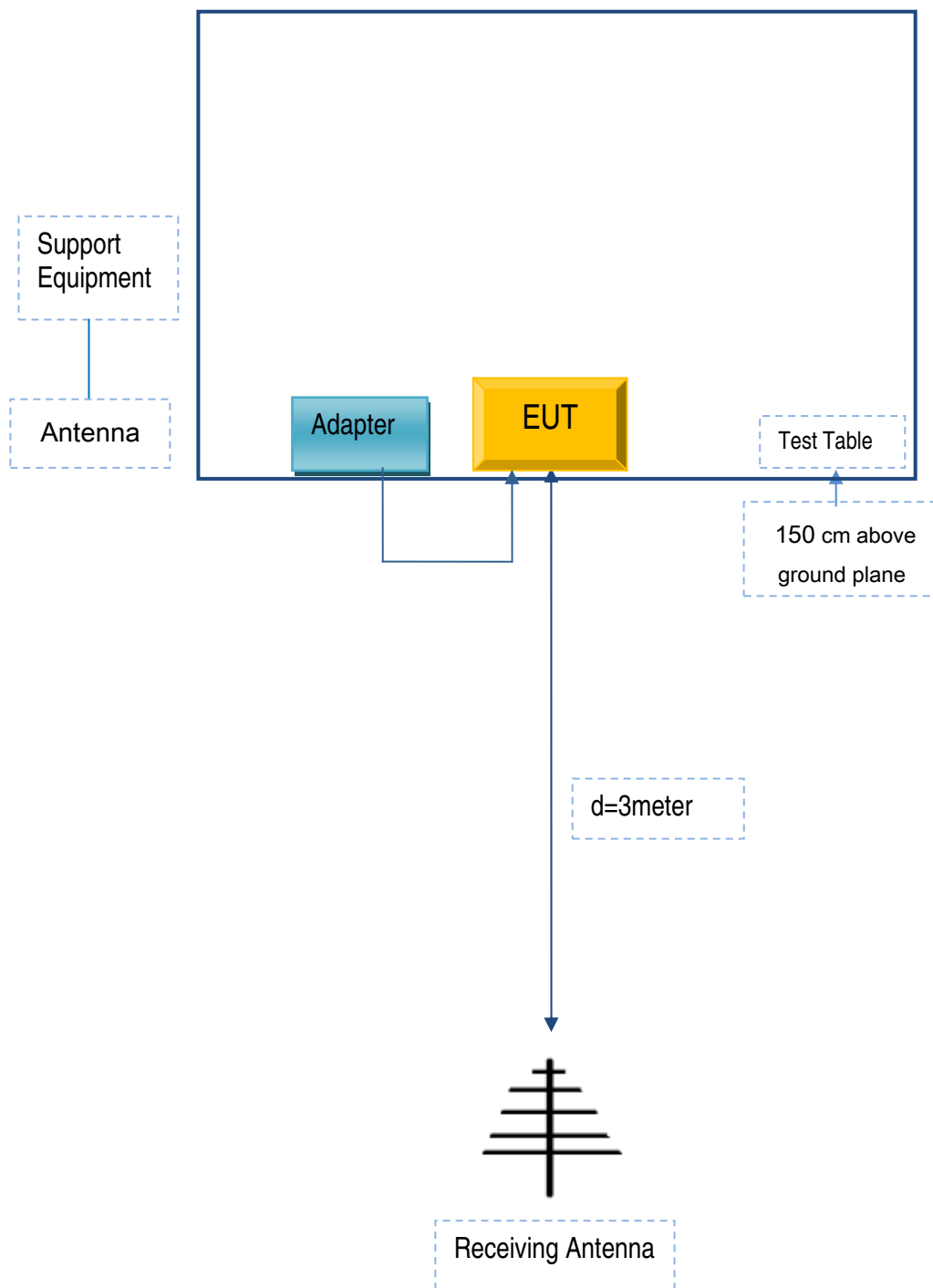


Radiated Spurious Emissions Test Setup Above
1GHz

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.

Manufacturer	Equipment Description	Model	Serial No
SMT TELECOMM HK LIMITED	Adapter	PC X410	CN15010451

Supporting Cable:

Cable type	Shield Type	Ferrite Core	Length	Serial No
USB Cable	Un-shielding	No	0.8m	JX1502542

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Annex C.ii. EUT OPERATING CONKITIONS

N/A

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

Please see attachment

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Annex E. DECLARATION OF SIMILARITY

N/A