RF TEST REPORT

Report No.: 17070294-FCC-R1

Supersede Report No.: N/A

Applicant	MOVILTELCO TRADE, S.L.
Product Name	Mobile phone
Model No.	L402
Serial No.	N/A
Test Standard	FCC Part 22(H):2016 ;FCC Part 24(E):2016; ANSI/TIA-603-D: 2010
Test Date	May 04 to 23, 2017
Issue Date	May 23, 2017
Test Result	☑ Pass ☐ Fail
Equipment complied with the specification	☑
Equipment did not comply with the specification	☐

Loren Luo	David Huang	
Loren Luo Test Engineer	David Huang Checked By	

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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
17070294-FCC-R1	NONE	Original	May 23, 2017

2. Customer information

Applicant Name	MOVILTELCO TRADE, S.L.
Applicant Add	Street: ABTAO,25-1Floor A-office MADRID-SPAIN
Manufacturer	MOVILTELCO TRADE, S.L.
Manufacturer Add	Street: ABTAO,25-1Floor A-office MADRID-SPAIN

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(ICP-03A1)

4. Equipment under Test (EUT) Information

Description of EUT:	Mobile phone
Main Model:	L402
Serial Model:	N/A
Date EUT received:	May 03, 2017
Test Date(s):	May 04 to 23, 2017
Equipment Category：	PCE
Antenna Gain:	GSM850:0dBi PCS1900: 0dBi UMTS-FDD Band V: 0dBi UMTS-FDD Band II: 0dBi LTE Band II: 0dBi WIFI: 0dBi Bluetooth: 0dBi GPS: 0dBi
Antenna Type:	PIFA antenna
Type of Modulation:	GSM / GPRS: GMSK EGPRS: GMSK,8PSK UMTS-FDD: QPSK LTE Band: QPSK, 16QAM 802.11b/g/n: DSSS, OFDM Bluetooth: GFSK, π /4DQPSK, 8DPSK GPS:BPSK

RF Operating Frequency (ies):	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; RX: 1932.4 ~ 1987.6 MHz LTE Band II TX: 1850.7~ 1909.3 MHz; RX : 1930.7 ~ 1989.3 MHz WIFI: 802.11b/g/n(20M): 2412-2462 MHz Bluetooth: 2402-2480 MHz GPS: 1575.42 MHz
Maximum Conducted AV Power to Antenna:	GSM Vioce:GSM850: 33.09dBm PCS1900: 30.81 dBm GPRS:GSM850: 33.07dBm PCS1900: 30.79dBm EGPRS(MSC1):GSM850: 33.07dBm PCS1900: 30.73 dBm RMC:UMTS-FDD Band V: 23.57 dBm UMTS-FDD Band II: 23.08 dBm HSUPA:UMTS-FDD Band V: 22.76dBm UMTS-FDD Band II: 21.97dBm HSDPA:UMTS-FDD Band V: 22.80dBm UMTS-FDD Band II: 21.95 dBm
ERP/EIRP:	GSM Vioce:GSM850: 30.94dBm / ERP PCS1900: 30.81dBm / EIRP GPRS:GSM850: 30.92dBm / ERP PCS1900: 30.79 dBm / EIRP EGPRS(MCS1):GSM850: 30.92 dBm / ERP PCS1900: 30.73dBm / EIRP RMC:UMTS-FDD Band V: 21.42 dBm / ERP UMTS-FDD Band II: 23.08 dBm / EIRP HSDPA:UMTS-FDD Band V: 20.61 dBm / ERP UMTS-FDD Band II: 21.95 dBm / EIRP HSUPA:UMTS-FDD Band V: 20.65 dBm / ERP UMTS-FDD Band II: 21.97 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 Bluetooth: 79CH GPS:1CH
Port:	USB Port, Earphone Port
Input Power:	Adapter: Model: L402 Input: AC100-240V~50/60Hz,0.15A Output: DC 5.0V,500mA Battery : Model: L402 Spec: 3.7V,5.18WH(min/typ) Voltage of charge limited:4.2V
Trade Name :	Mtt/movistar
GPRS/ EGPRS Multi-slot class	8/10/12
FCC ID:	2ACQKTELCO012

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); § 27.50(c.10) ;	RF Output Power	Compliance
§ 24.232 (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

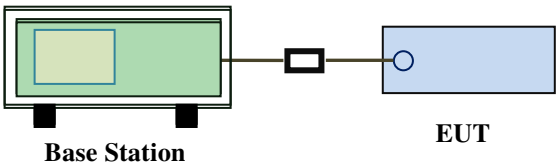
The EUT is a portable device, thus requires SAR evaluation;

Please refer to RF Exposure Evaluation Report: 17070294-FCC-H.

6.2 RF Output Power

Temperature	25℃
Relative Humidity	58%
Atmospheric Pressure	1016mbar
Test date :	May 16, 2017
Tested By :	Loren Luo

Requirement(s):

Spec	Item	Requirement	Applicable
§22.913 (a)	a)	ERP:38.45dBm	☑
§24.232 (c)	b)	EIRP:33dBm	☑
Test Setup			
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 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 (TX power in Watts/0.001) – the absolute level - Spurious attenuation limit in dB = 43 + 10 Log10 (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	33.07	33.07	**33.09**	33±1	30.35	30.43	**30.81**	30.5±1
GPRS Multi-Slot Class 8 (1 uplink),GMSK	33.04	33.07	**33.07**	33±1	30.34	30.42	**30.79**	30.5±1
GPRS Multi-Slot Class 10 (2 uplink) GMSK	31.09	31.18	31.18	31±1	27.76	28.24	28.43	28±1
GPRS Multi-Slot Class 12 (4 uplink) GMSK	27.34	27.35	27.35	27±1	24.01	24.52	24.73	24.5±1
EGPRS Multi-Slot Class 8 (1 uplink) GMSK MCS1	33.01	33.05	**33.07**	33±1	30.23	30.38	**30.73**	30.5±1
EGPRS Multi-Slot Class 10 (2 uplink) GMSK MCS1	31.08	31.17	31.18	31±1	27.72	28.17	28.38	28±1
EGPRS Multi-Slot Class 12 (4 uplink) GMSK MCS1	27.31	27.34	27.36	27±1	24.01	24.47	24.68	24.5±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

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	**23.57**	23.5±1
	4175	835	23.46	23.5±1
	4233	846.6	23.45	23.5±1
HSDPA Subtest1	4132	826.4	22.53	22.5±1
	4175	835	22.56	22.5±1
	4233	846.6	22.55	22.5±1
HSDPA Subtest2	4132	826.4	**22.76**	22.5±1
	4175	835	22.70	22.5±1
	4233	846.6	22.74	22.5±1
HSDPA Subtest3	4132	826.4	22.53	22.5±1
	4175	835	22.57	22.5±1
	4233	846.6	22.59	22.5±1
HSDPA Subtest4	4132	826.4	22.74	22.5±1
	4175	835	22.72	22.5±1
	4233	846.6	22.70	22.5±1
HSUPA Subtest1	4132	826.4	22.58	22.5±1
	4175	835	22.60	22.5±1
	4233	846.6	22.56	22.5±1
HSUPA Subtest2	4132	826.4	22.73	22.5±1
	4175	835	22.75	22.5±1
	4233	846.6	22.76	22.5±1
HSUPA Subtest3	4132	826.4	22.73	22.5±1
	4175	835	22.75	22.5±1
	4233	846.6	22.70	22.5±1
HSUPA Subtest4	4132	826.4	22.53	22.5±1
	4175	835	22.57	22.5±1
	4233	846.6	22.56	22.5±1
HSUPA Subtest5	4132	826.4	22.75	22.5±1
	4175	835	22.71	22.5±1
	4233	846.6	**22.80**	22.5±1

UMTS-FDD Band II

Band/ Time Slot configuration	Channel	Frequency	Average power (dBm)	Tune up Power tolerant
RMC 12.2kbps	9262	1852.4	22.67	22.5±1
	9400	1880	22.90	22.5±1
	9538	1907.6	**23.08**	22.5±1
HSDPA Subtest1	9262	1852.4	21.93	21.5±1
	9400	1880	21.90	21.5±1
	9538	1907.6	21.86	21.5±1
HSDPA Subtest2	9262	1852.4	21.71	21.5±1
	9400	1880	21.73	21.5±1
	9538	1907.6	21.70	21.5±1
HSDPA Subtest3	9262	1852.4	21.63	21.5±1
	9400	1880	21.68	21.5±1
	9538	1907.6	21.64	21.5±1
HSDPA Subtest4	9262	1852.4	21.92	21.5±1
	9400	1880	**21.95**	21.5±1
	9538	1907.6	21.91	21.5±1
HSUPA Subtest1	9262	1852.4	21.73	21.5±1
	9400	1880	21.72	21.5±1
	9538	1907.6	21.71	21.5±1
HSUPA Subtest2	9262	1852.4	21.95	21.5±1
	9400	1880	21.91	21.5±1
	9538	1907.6	**21.97**	21.5±1
HSUPA Subtest3	9262	1852.4	21.63	21.5±1
	9400	1880	21.62	21.5±1
	9538	1907.6	21.73	21.5±1
HSUPA Subtest4	9262	1852.4	21.66	21.5±1
	9400	1880	21.63	21.5±1
	9538	1907.6	21.67	21.5±1
HSUPA Subtest5	9262	1852.4	21.83	21.5±1
	9400	1880	21.85	21.5±1
	9538	1907.6	21.87	21.5±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	24.65	V	6.8	0.53	30.92	38.45
824.2	23.48	H	6.8	0.53	29.75	38.45
836.6	24.65	V	6.8	0.53	30.92	38.45
836.6	23.61	H	6.8	0.53	29.88	38.45
848.8	24.57	V	6.9	0.53	**30.94**	38.45
848.8	14.52	H	6.9	0.53	20.89	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	23.32	V	7.88	0.85	30.35	33
1850.2	22.18	H	7.88	0.85	29.21	33
1880	23.4	V	7.88	0.85	30.43	33
1880	22.34	H	7.88	0.85	29.37	33
1909.8	23.8	V	7.86	0.85	**30.81**	33
1909.8	22.65	H	7.86	0.85	29.66	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	24.62	V	6.8	0.53	30.89	38.45
824.2	23.45	H	6.8	0.53	29.72	38.45
836.6	24.65	V	6.8	0.53	**30.92**	38.45
836.6	23.56	H	6.8	0.53	29.83	38.45
848.8	24.55	V	6.9	0.53	30.92	38.45
848.8	23.48	H	6.9	0.53	29.85	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	23.31	V	7.88	0.85	30.34	33
1850.2	22.26	H	7.88	0.85	29.29	33
1880	23.39	V	7.88	0.85	30.42	33
1880	22.32	H	7.88	0.85	29.35	33
1909.8	23.78	V	7.86	0.85	**30.79**	33
1909.8	22.63	H	7.86	0.85	29.64	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	24.59	V	6.8	0.53	30.86	38.45
824.2	23.44	H	6.8	0.53	29.71	38.45
836.6	24.65	V	6.8	0.53	**30.92**	38.45
836.6	23.51	H	6.8	0.53	29.78	38.45
848.8	24.53	V	6.9	0.53	30.90	38.45
848.8	23.46	H	6.9	0.53	29.83	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	23.2	V	7.88	0.85	30.23	33
1850.2	22.12	H	7.88	0.85	29.15	33
1880	23.35	V	7.88	0.85	30.38	33
1880	22.18	H	7.88	0.85	29.21	33
1909.8	23.72	V	7.86	0.85	**30.73**	33
1909.8	22.57	H	7.86	0.85	29.58	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	15.15	V	6.8	0.53	**21.42**	38.45
826.4	14.06	H	6.8	0.53	20.33	38.45
835	15.04	V	6.8	0.53	21.31	38.45
835	13.97	H	6.8	0.53	20.24	38.45
846.6	14.93	V	6.9	0.53	21.30	38.45
846.6	13.81	H	6.9	0.53	20.18	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	15.64	V	7.88	0.85	22.67	33
1852.4	14.49	H	7.88	0.85	21.52	33
1880	15.87	V	7.88	0.85	22.90	33
1880	14.73	H	7.88	0.85	21.76	33
1907.6	16.07	V	7.86	0.85	**23.08**	33
1907.6	14.88	H	7.86	0.85	21.89	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	14.34	V	6.8	0.53	**20.61**	38.45
826.4	13.28	H	6.8	0.53	19.55	38.45
835	14.3	V	6.8	0.53	20.57	38.45
835	13.16	H	6.8	0.53	19.43	38.45
846.6	14.22	V	6.9	0.53	20.59	38.45
846.6	12.99	H	6.9	0.53	19.36	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	14.9	V	7.88	0.85	21.93	33
1852.4	13.71	H	7.88	0.85	20.74	33
1880	14.92	V	7.88	0.85	**21.95**	33
1880	13.78	H	7.88	0.85	20.81	33
1907.6	14.9	V	7.86	0.85	21.91	33
1907.6	13.78	H	7.86	0.85	20.79	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	14.33	V	6.8	0.53	20.60	38.45
826.4	13.2	H	6.8	0.53	19.47	38.45
835	14.33	V	6.8	0.53	20.60	38.45
835	13.18	H	6.8	0.53	19.45	38.45
846.6	14.28	V	6.9	0.53	**20.65**	38.45
846.6	13.16	H	6.9	0.53	19.53	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	14.92	V	7.88	0.85	21.95	33
1852.4	13.85	H	7.88	0.85	20.88	33
1880	14.88	V	7.88	0.85	21.91	33
1880	13.76	H	7.88	0.85	20.79	33
1907.6	14.96	V	7.86	0.85	**21.97**	33
1907.6	13.79	H	7.86	0.85	20.80	33

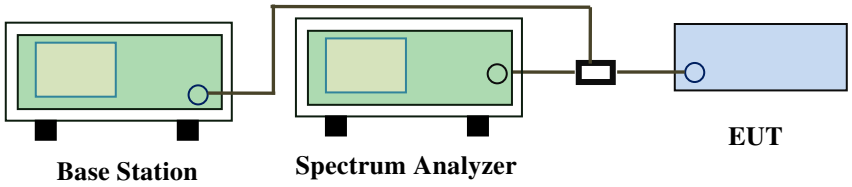
6.3 Peak-Average Ratio

Temperature	25℃
Relative Humidity	58%
Atmospheric Pressure	1016mbar
Test date :	May 16, 2017
Tested By :	Loren Luo

Requirement(s):

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

Test Setup



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 ≥ 98%) and at all times the EUT is transmitting at is maximum output

	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 10log(1/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	30.59	30.35	0.24
1880	30.88	30.43	0.45
1909.8	30.93	30.81	0.12

GPRS 1900 PK-AV POWER (PART 24E)

Frequency (MHz)	Conducted power(dBm)		Peak-Average Ratio(PAR)
	Peak	Average	
1850.2	30.69	30.34	0.35
1880	30.62	30.42	0.20
1909.8	30.95	30.79	0.16

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

Frequency (MHz)	Conducted power(dBm)		Peak-Average Ratio(PAR)
	Peak	Average	
1850.2	30.55	30.23	0.32
1880	30.67	30.38	0.29
1909.8	30.92	30.73	0.19

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

Frequency (MHz)	Conducted power(dBm)		Peak-Average Ratio(PAR)
	Peak	Average	
1852.4	22.83	22.67	0.16
1880	23.05	22.9	0.15
1907.6	23.21	23.08	0.13

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

Frequency (MHz)	Conducted power(dBm)		Peak-Average Ratio(PAR)
	Peak	Average	
1852.4	22.16	21.93	0.23
1880	22.08	21.9	0.18
1907.6	22.05	21.86	0.19

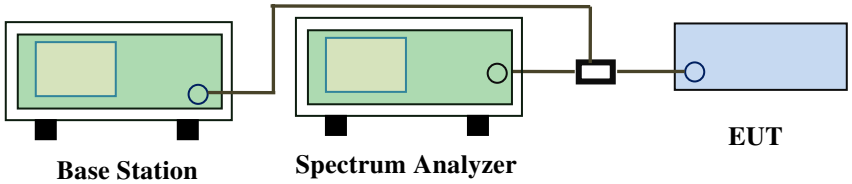
HSUPA ：UMTS-FDD Band 2 PK-AV POWER (PART 24E)

Frequency (MHz)	Conducted power(dBm)		Peak-Average Ratio(PAR)
	Peak	Average	
1852.4	21.96	21.73	0.23
1880	21.85	21.72	0.13
1907.6	21.90	21.71	0.19

6.4 Occupied Bandwidth

Temperature	22℃
Relative Humidity	55%
Atmospheric Pressure	1013mbar
Test date :	May 15, 2017
Tested By :	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			
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	246.6762	322.532
190	836.6	250.0551	319.866
251	848.8	242.1435	324.436

PCS Band (Part 24E) result

Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Bandwidth (kHz)
512	1850	246.6970	317.790
661	1880	245.0020	323.423
810	1910	248.7587	318.086

GPRS:

Cellular Band (Part 22H) result

Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Bandwidth (kHz)
128	824.2	242.9558	318.381
190	836.6	250.9270	321.826
251	848.8	249.5879	318.331

PCS Band (Part 24E) result

Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Bandwidth (kHz)
512	1850	244.4402	319.585
661	1880	246.6484	316.862
810	1910	244.3086	317.801

EGPRS (MSC 1):

Cellular Band (Part 22H) result

Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Bandwidth (kHz)
128	824.2	244.7590	321.801
190	836.6	247.9342	319.673
251	848.8	246.1394	319.818

PCS Band (Part 24E) result

Channel	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Bandwidth (kHz)
512	1850	246.5823	319.116
661	1880	241.9901	316.840
810	1910	249.4963	321.113

RMC:

UMTS-FDD Band V (Part 22H)

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
4132	826.6	4.1017	4.665
4175	835.0	4.0921	4.696
4233	846.4	4.0947	4.691

UMTS-FDD Band II (Part 24E)

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
9262	1853	4.1074	4.701
9400	1880	4.1022	4.661
9538	1907	4.1044	4.712

HSDPA:

UMTS-FDD Band V (Part 22H)

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
4132	826.6	4.1016	4.692
4175	835.0	4.1029	4.668
4233	846.4	4.1142	4.673

UMTS-FDD Band II (Part 24E)

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
9262	1853	4.0940	4.692
9400	1880	4.1112	4.663
9538	1907	4.0914	4.673

HSUPA:

UMTS-FDD Band V (Part 22H)

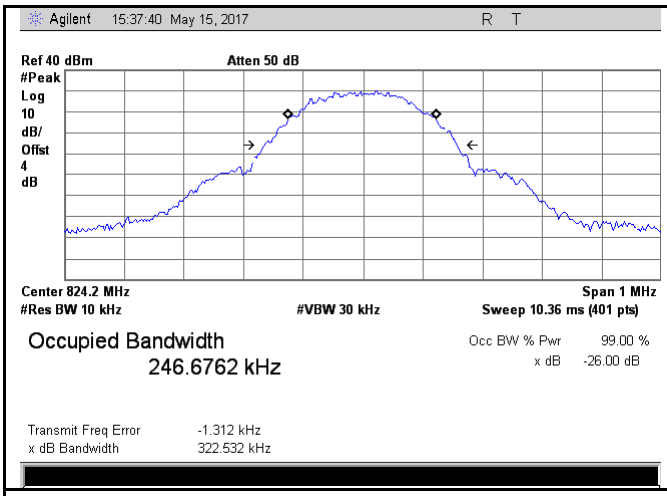
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
4132	826.6	4.0854	4.681
4175	835.0	4.1036	4.718
4233	846.4	4.0952	4.690

UMTS-FDD Band II (Part 24E)

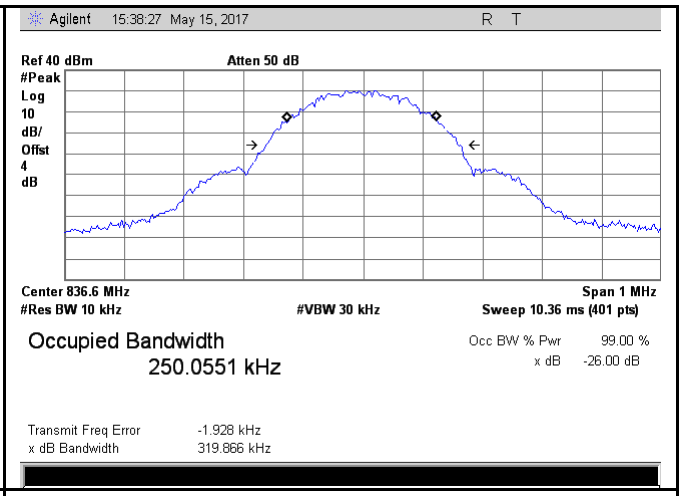
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
9262	1853	4.1003	4.686
9400	1880	4.1045	4.686
9538	1907	4.0928	4.707

Test Plots

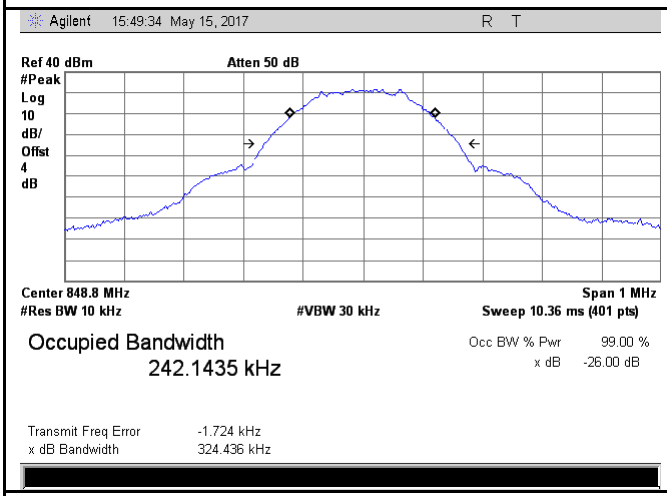
GSM Voice:



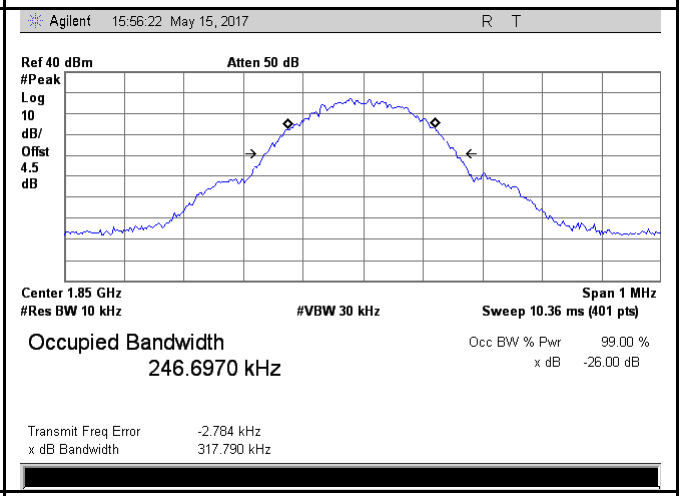
GSM 850 BW - Low CH 824.2MHz



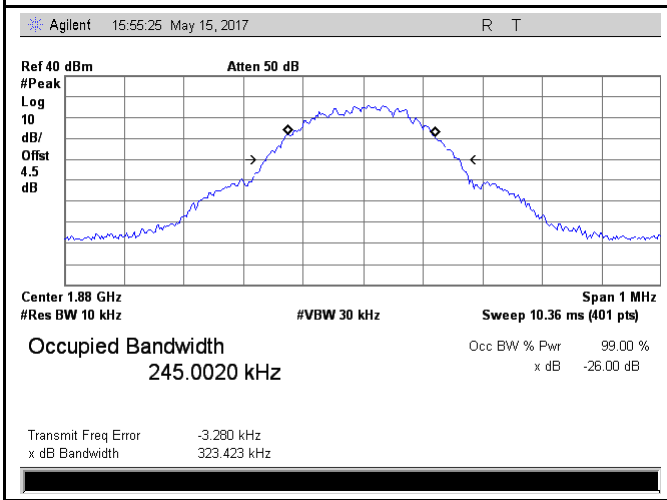
GSM 850 BW - Mid CH 836.6MHz



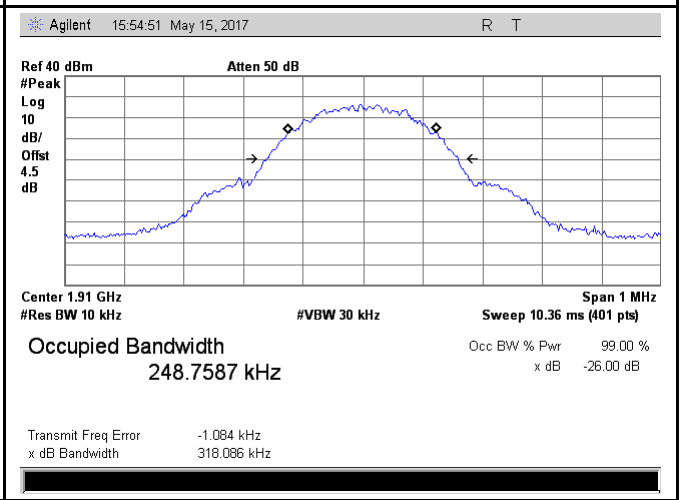
GSM 850 BW - High CH 848.8MHz



PCS 1900 BW - Low CH 1850MHz

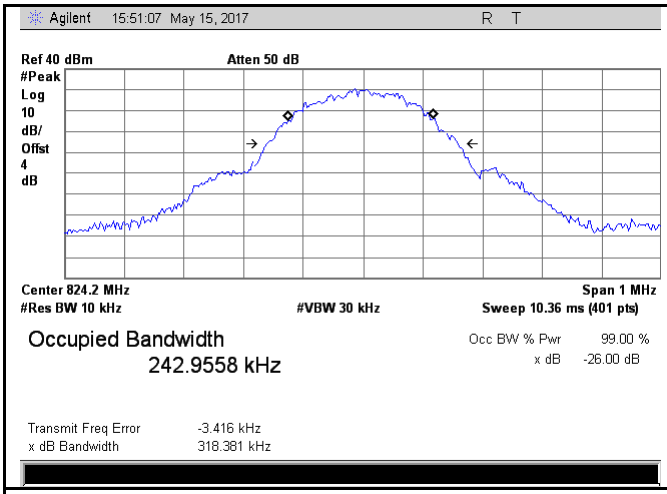


PCS 1900 BW - Mid CH 1880MHz

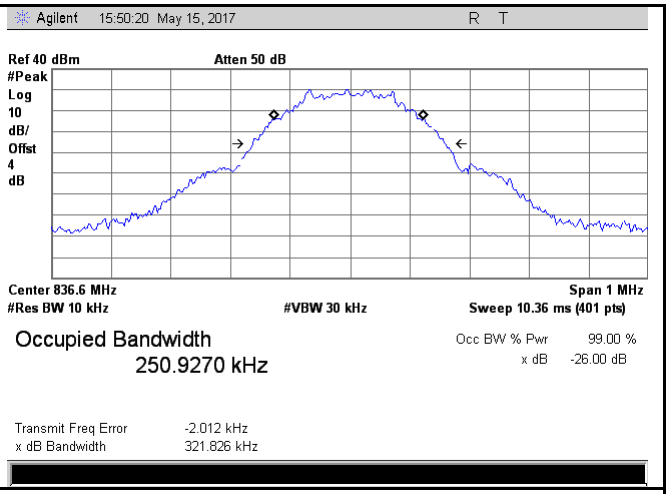


PCS 1900 BW - High CH 1910MHz

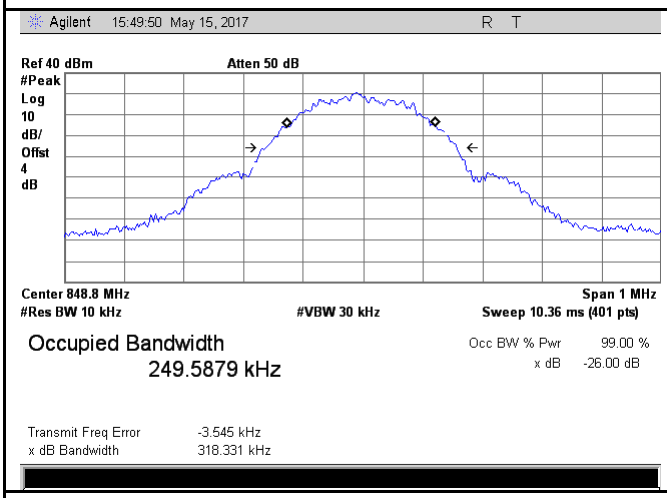
GPRS:



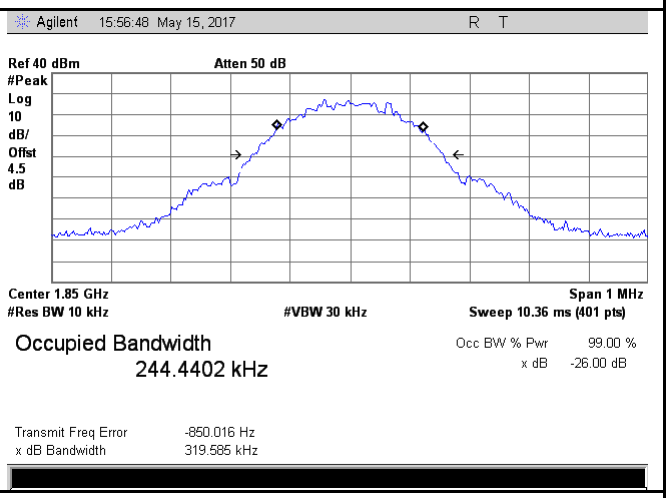
GSM 850 BW - Low CH 824.2MHz



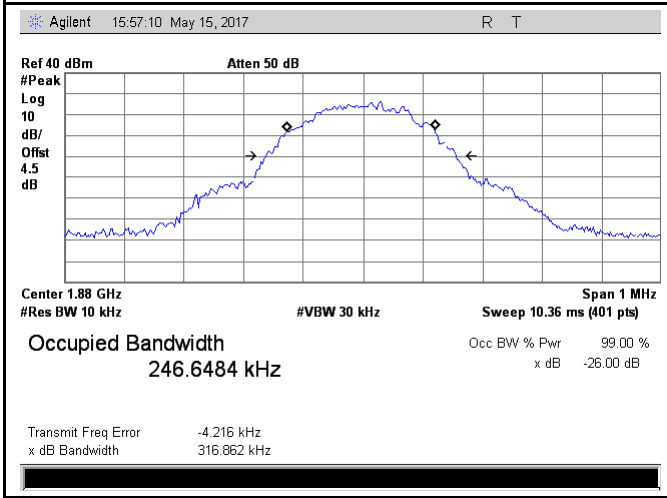
GSM 850 BW - Mid CH 836.6MHz



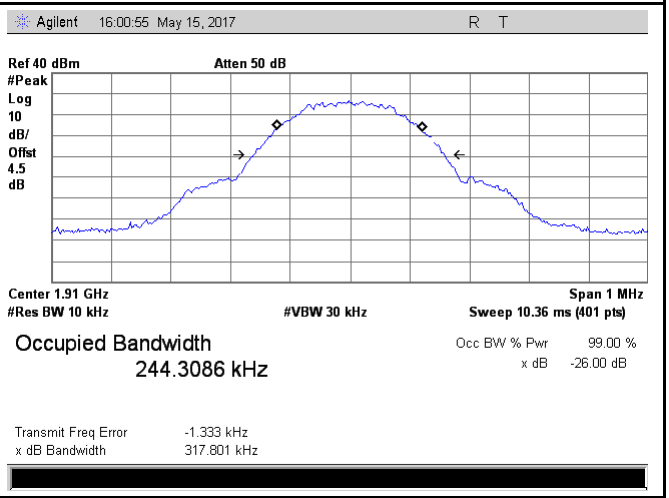
GSM 850 BW - High CH 848.8MHz



PCS 1900 BW - Low CH 1850MHz

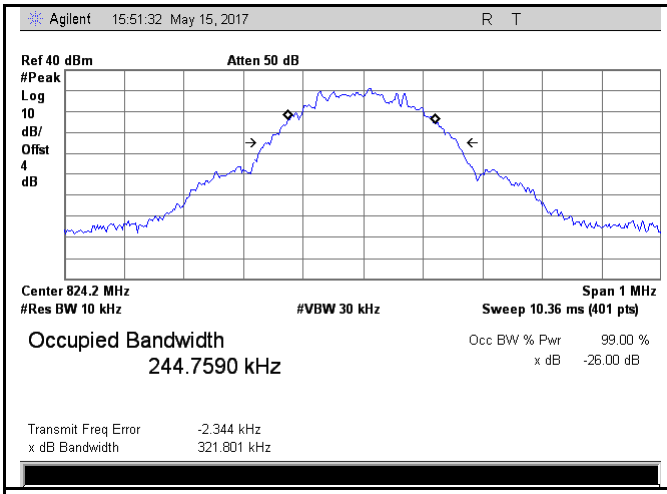


PCS 1900 BW - Mid CH 1880MHz

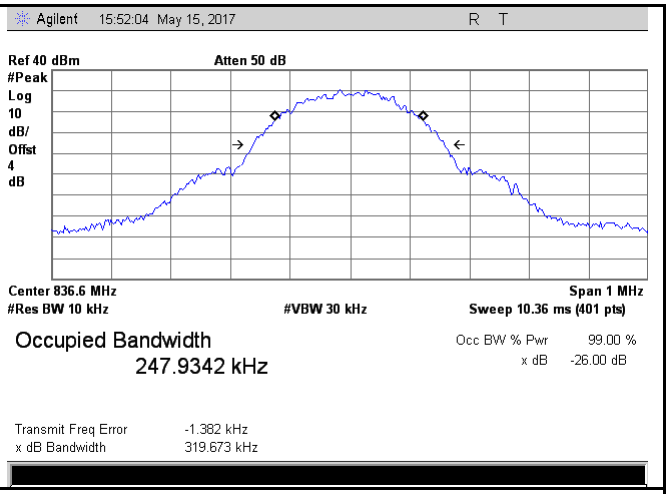


PCS 1900 BW - High CH 1910MHz

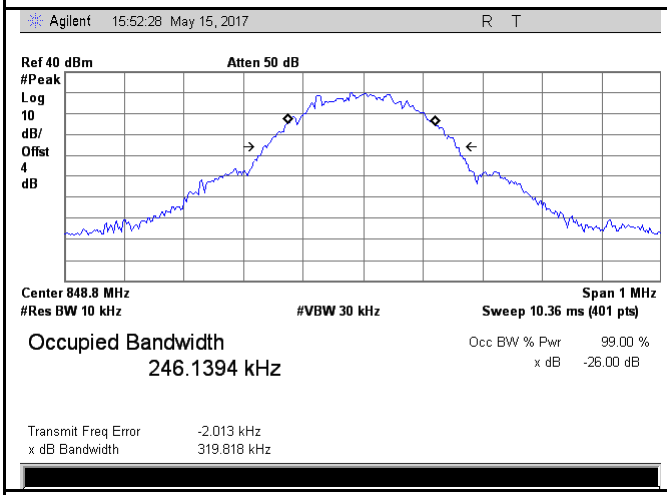
EGPRS (MCS1):



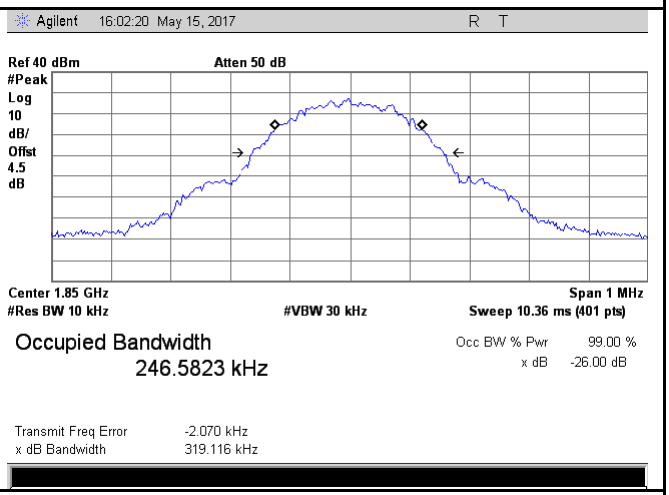
GSM 850 BW - Low CH 824.2MHz



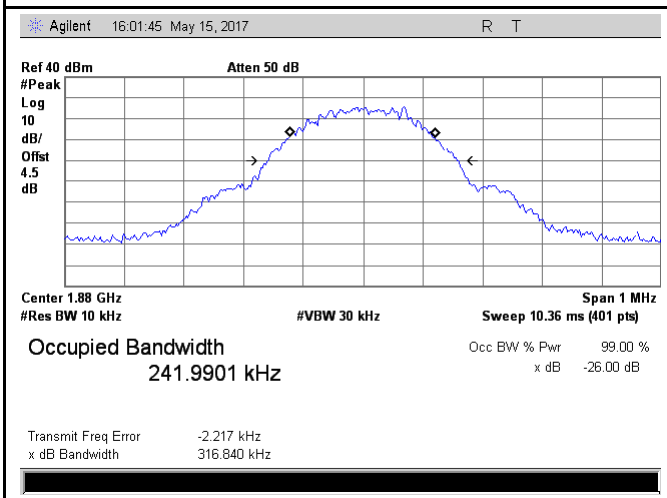
GSM 850 BW - Mid CH 836.6MHz



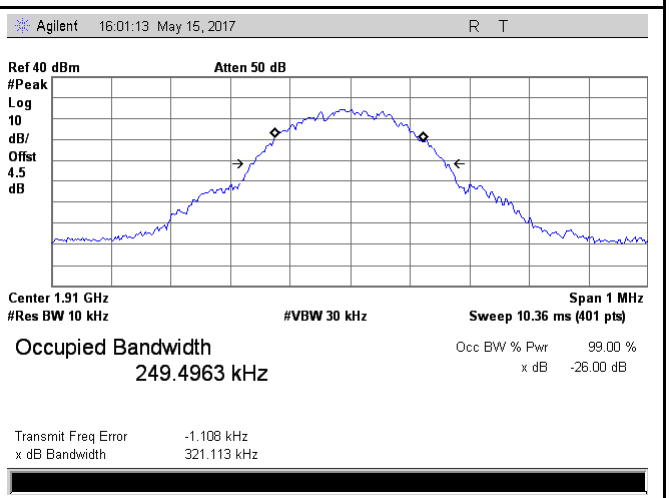
GSM 850 BW - High CH 848.8MHz



PCS 1900 BW - Low CH 1850MHz

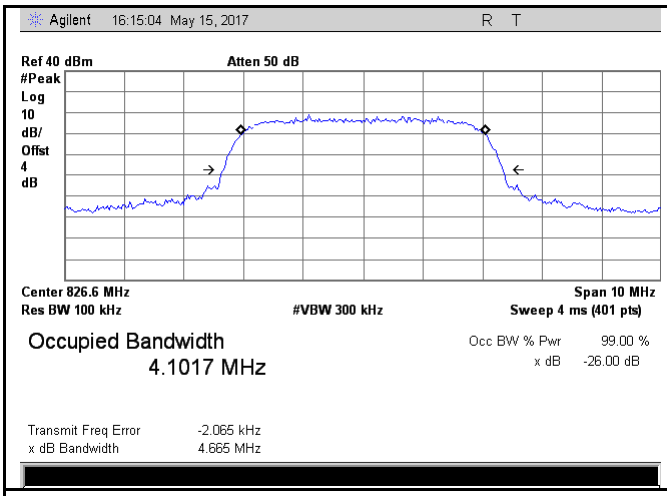


PCS 1900 BW - Mid CH 1880MHz

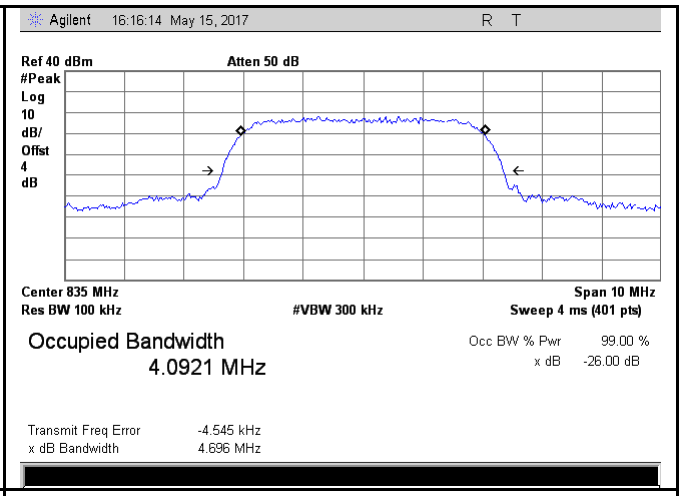


PCS 1900 BW - High CH 1910MHz

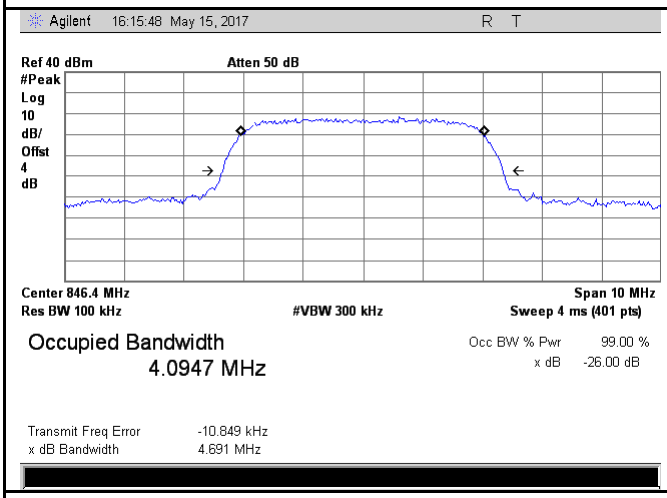
RMC:



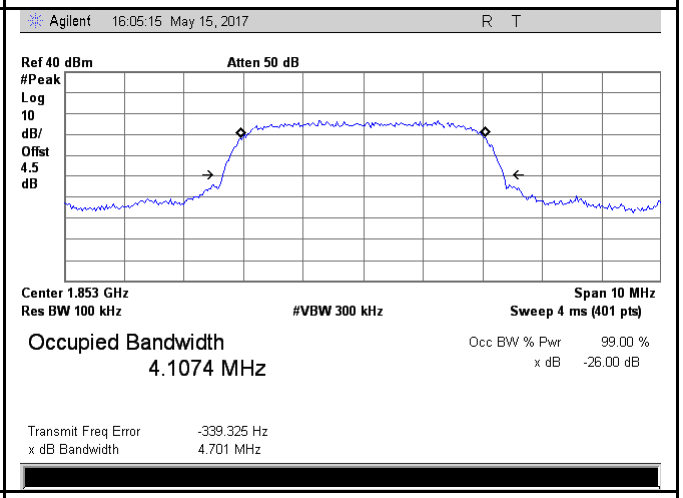
Band V BW - Low CH 826.6 MHz



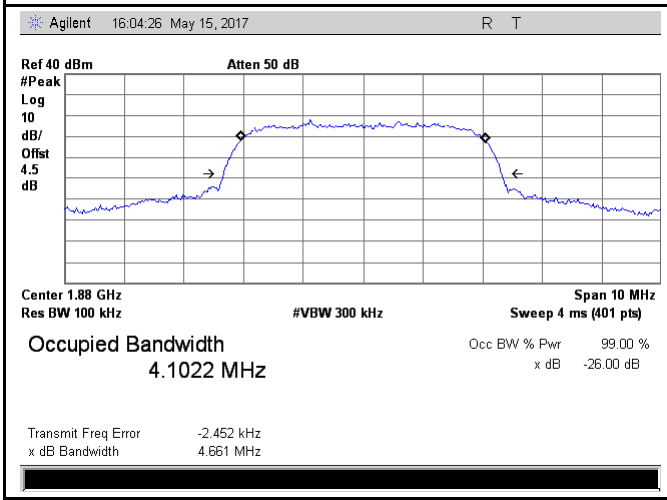
Band V BW - Mid CH 835.0 MHz



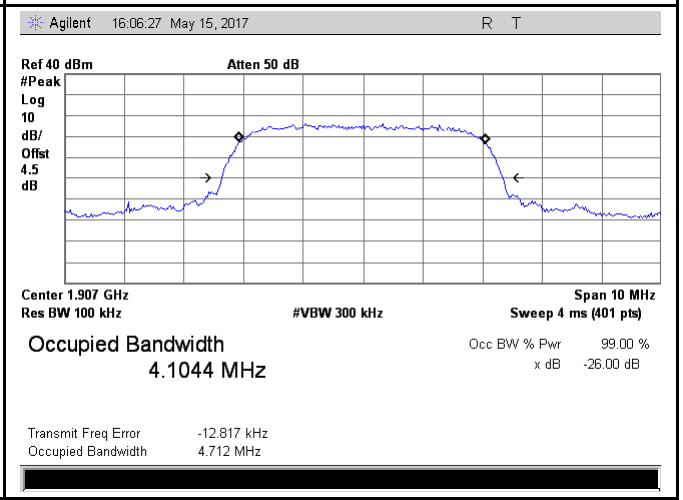
Band V BW - High CH 846.4 MHz



Band II BW - Low CH 1853MHz

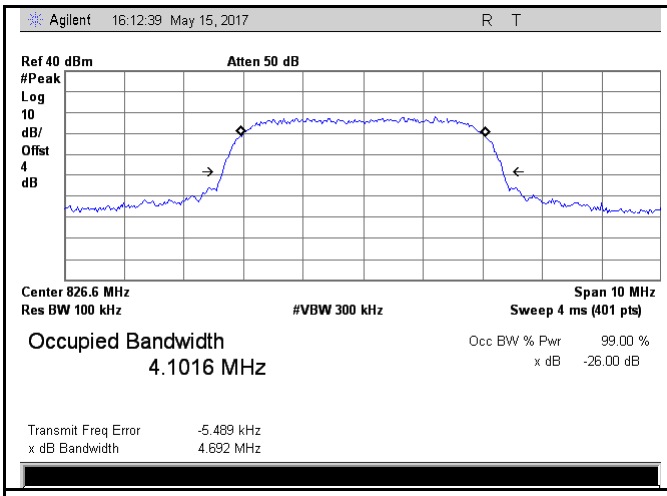


Band II BW - Mid CH 1880MHz

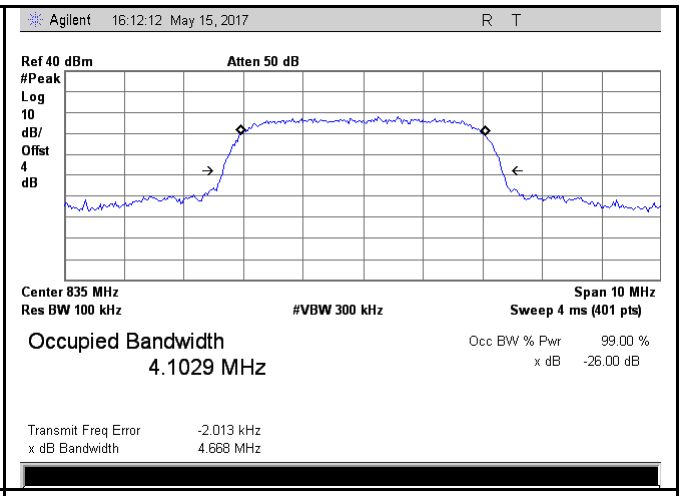


Band II BW - High CH 1907MHz

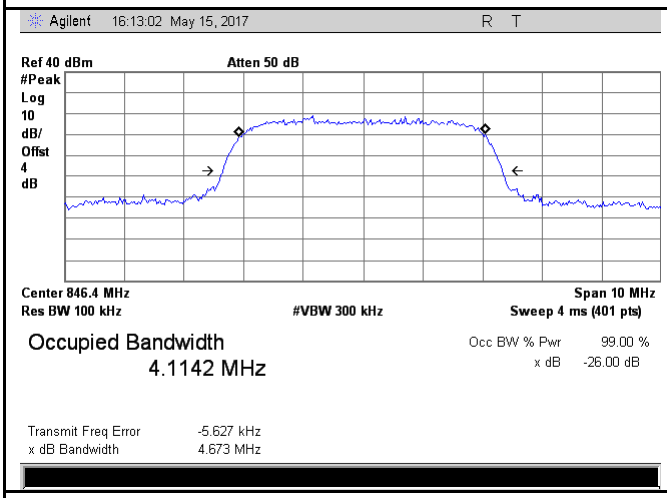
HSDPA:



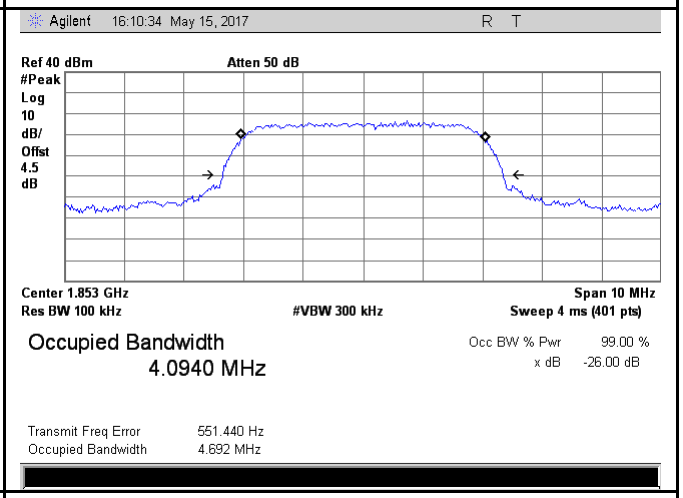
Band V BW - Low CH 826.6 MHz



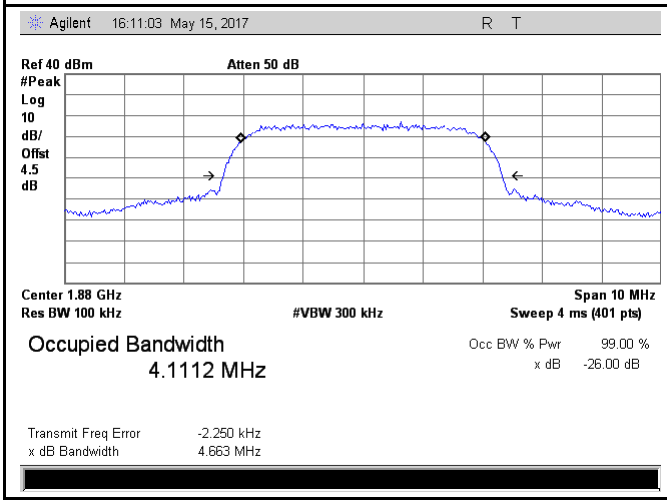
Band V BW - Mid CH 835.0 MHz



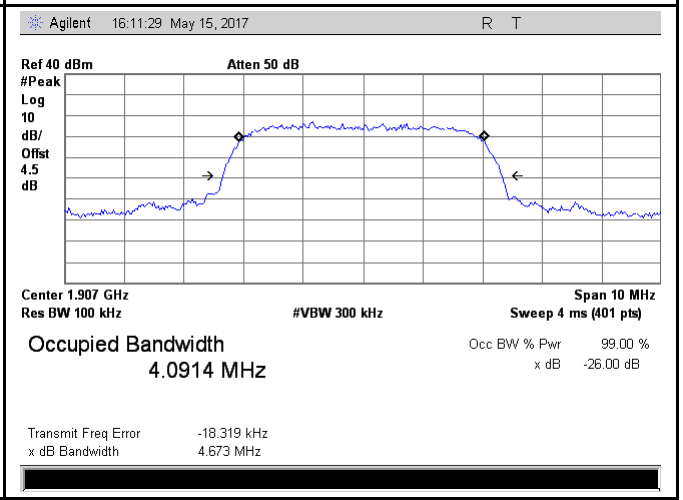
Band V BW - High CH 846.4 MHz



Band II BW - Low CH 1853MHz

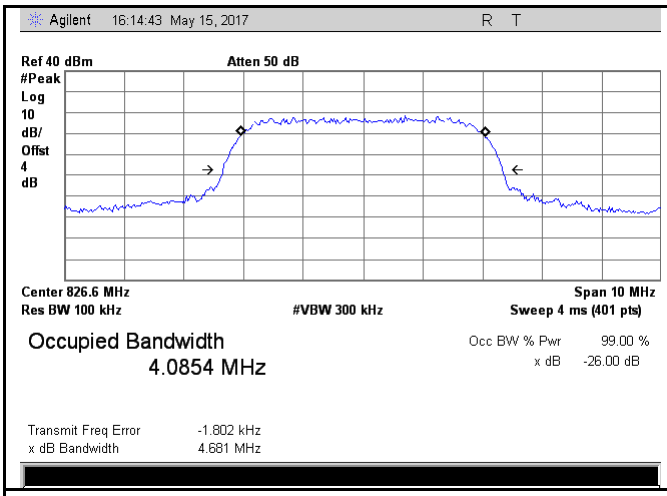


Band II BW - Mid CH 1880MHz

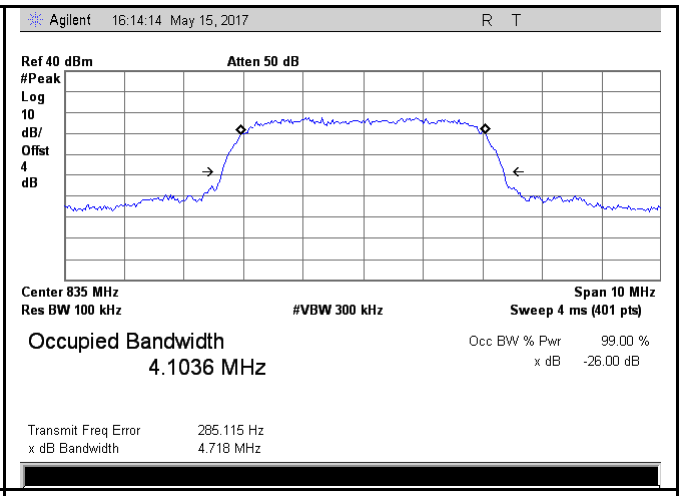


Band II BW - High CH 1907MHz

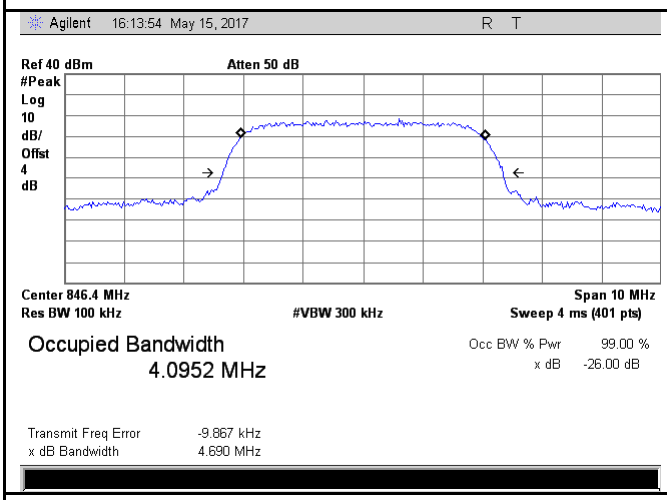
HSUPA:



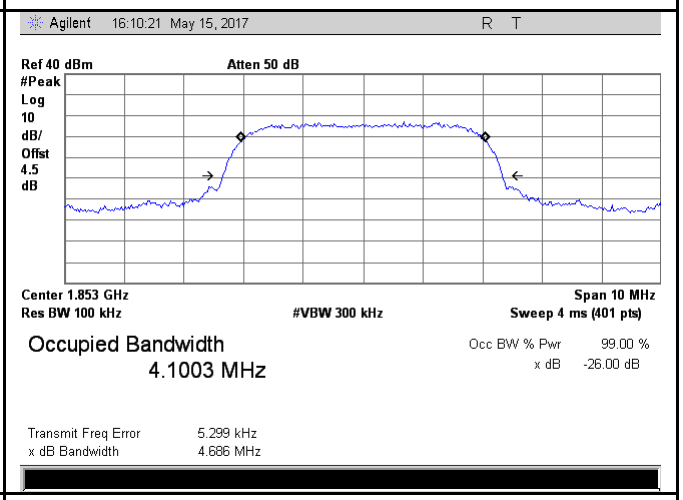
Band V BW - Low CH 826.6 MHz



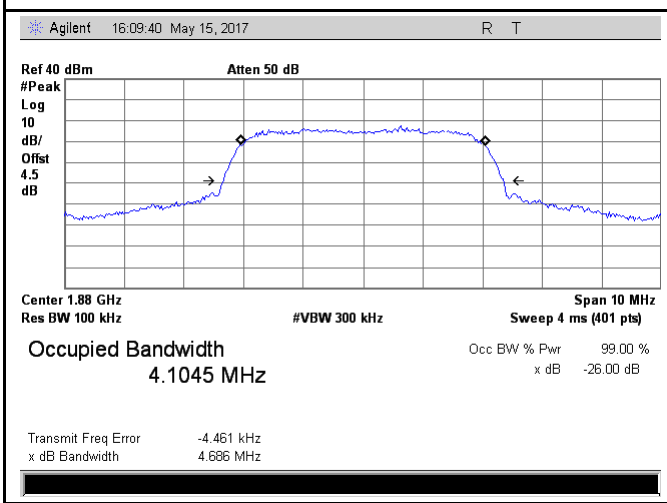
Band V BW - Mid CH 835.0 MHz



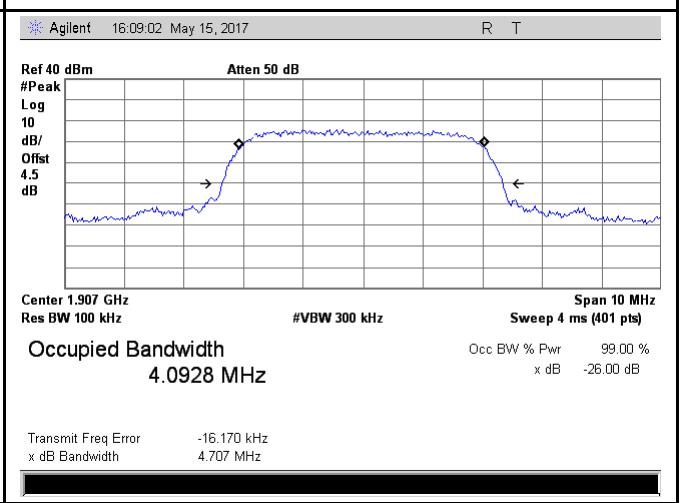
Band V BW - High CH 846.4 MHz



Band II BW - Low CH 1853MHz



Band II BW - Mid CH 1880MHz

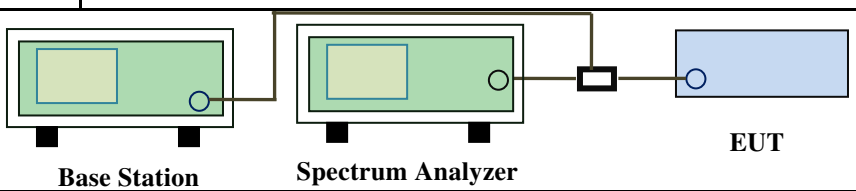


Band II BW - High CH 1907MHz

6.5 Spurious Emissions at Antenna Terminals

Temperature	22℃
Relative Humidity	55%
Atmospheric Pressure	1013mbar
Test date :	May 15, 2017
Tested By :	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			
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		

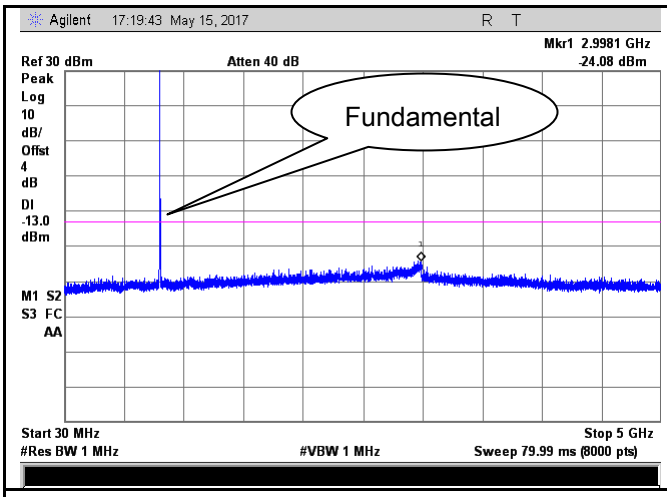
Test Data ☑ Yes ☐ N/A

Test Plot ☑ Yes (See below) ☐ N/A

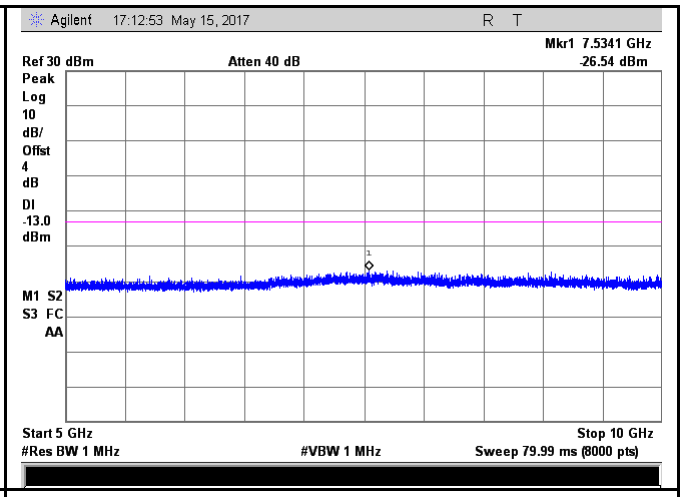
Test Plots

GSM Voice:

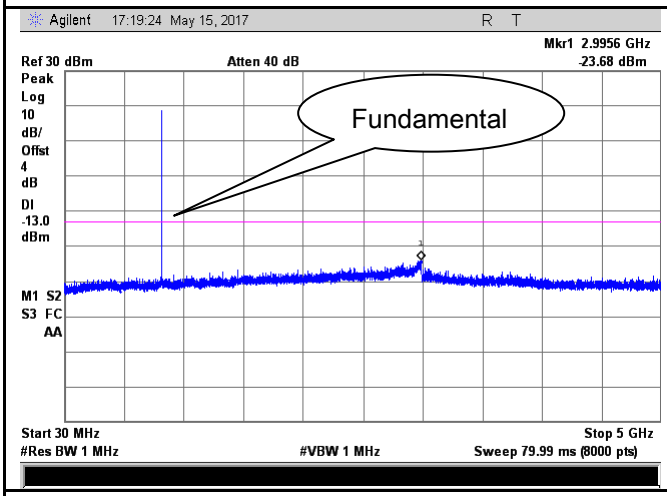
Cellular Band (Part 22H) result



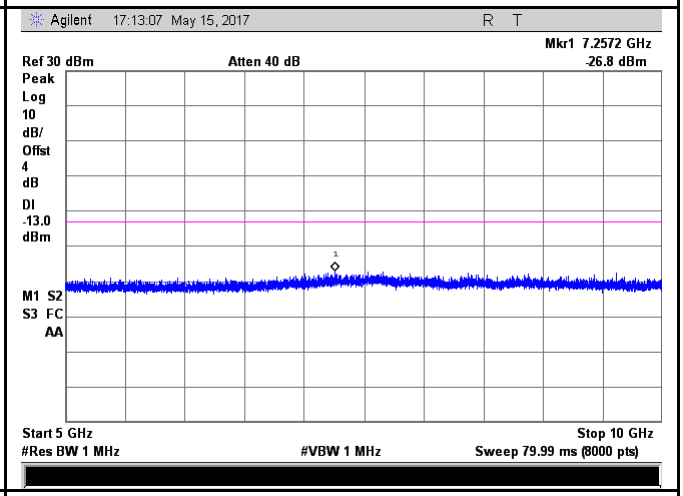
GSM 850 - Low Channel-1



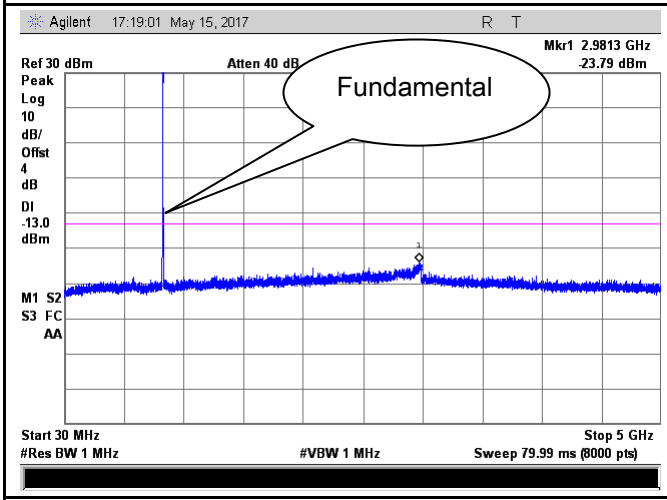
GSM 850 - Low Channel-2



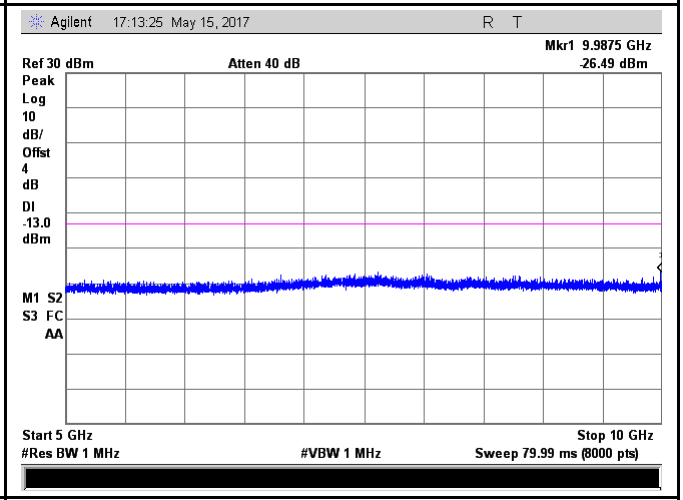
GSM 850 Middle Channel-1



GSM 850 Middle Channel-2

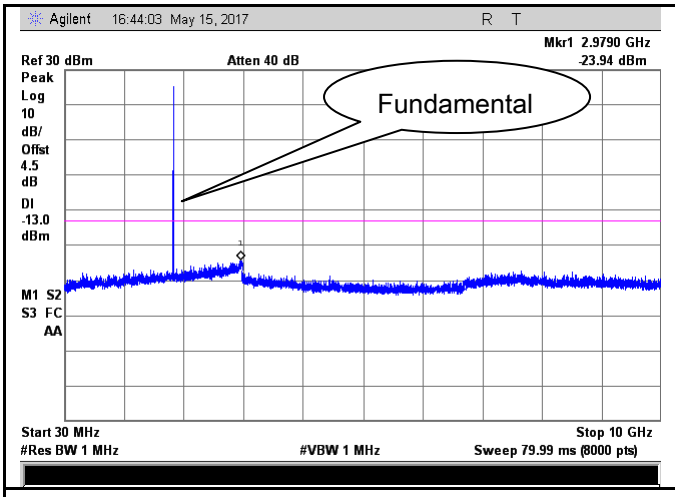


GSM 850 - High Channel-1

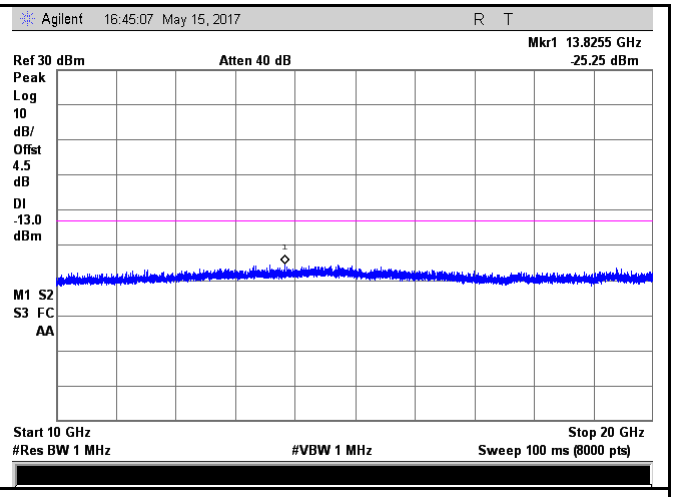


GSM 850 - High Channel-2

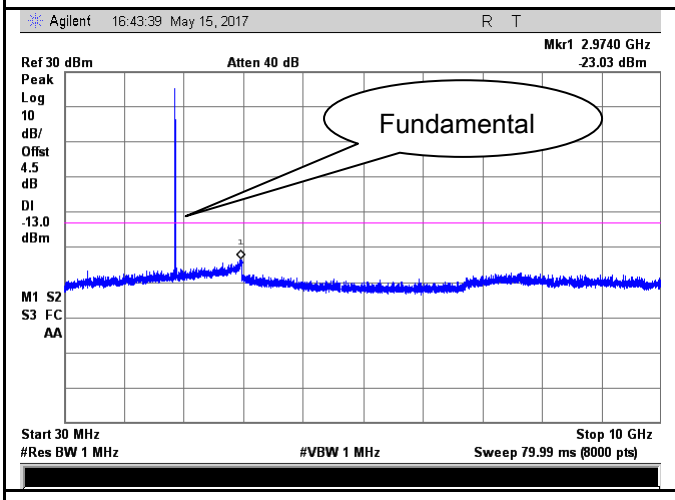
PCS Band (Part24E) result



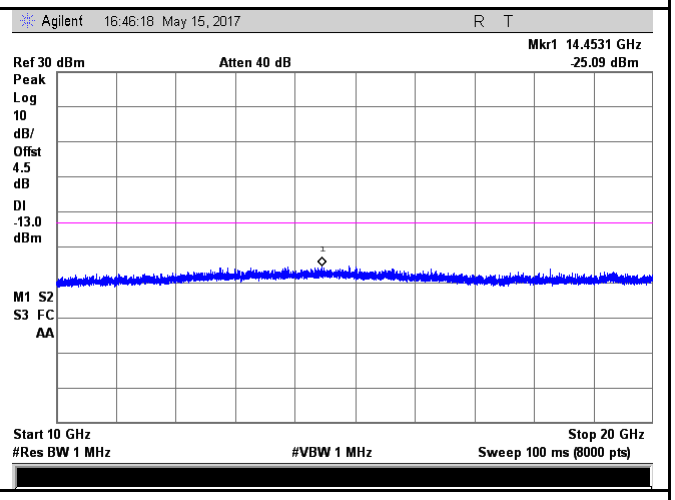
PCS1900 - Low Channel-1



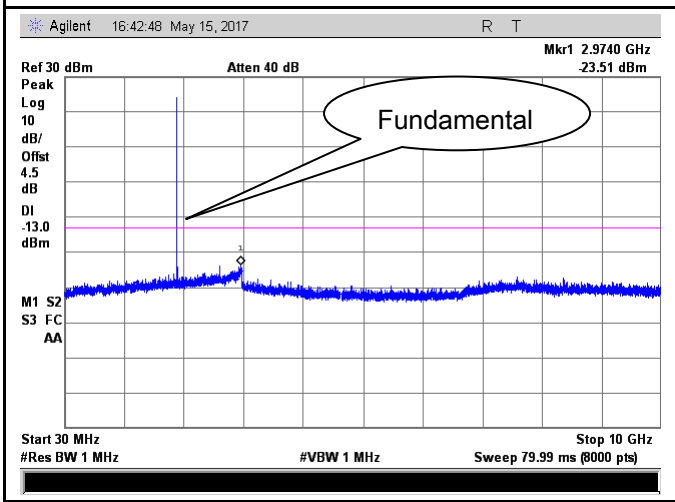
PCS 1900 - Low Channel-2



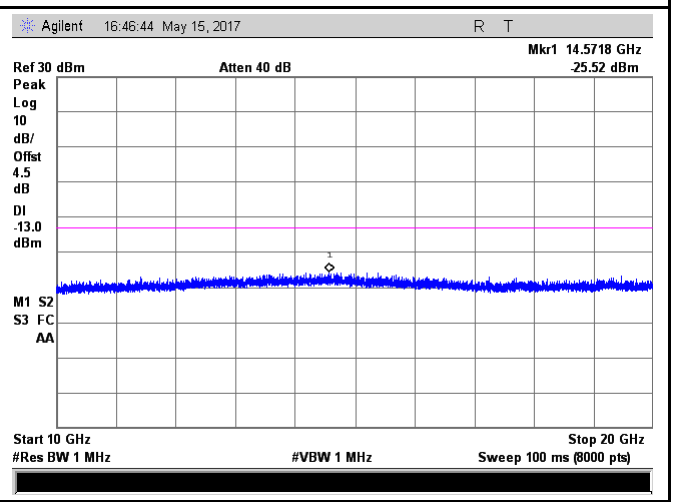
PCS1900 - Middle Channel-1



PCS 1900 - Middle Channel-2



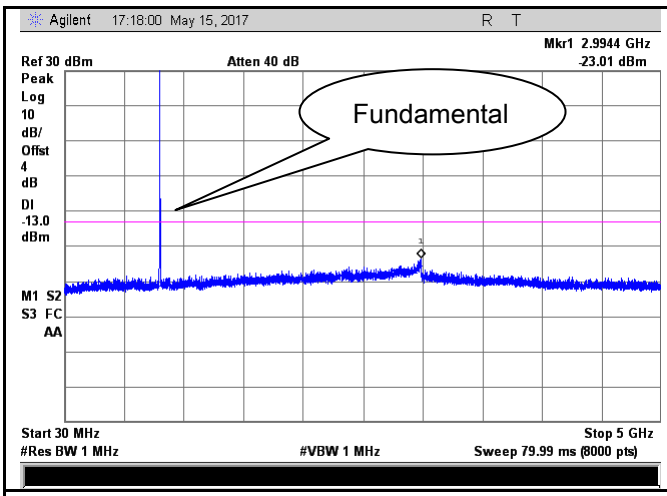
PCS1900 - High Channel-1



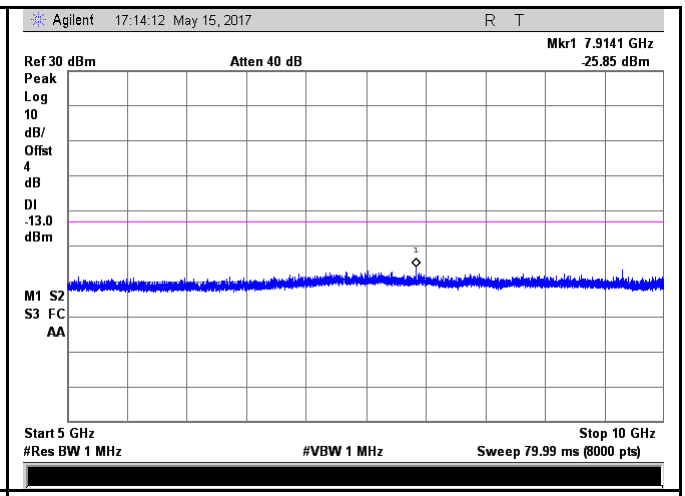
PCS 1900 - High Channel-2

GPRS:

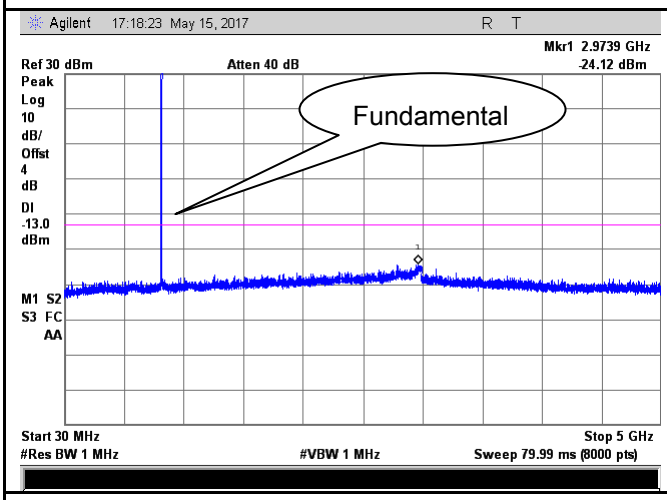
Cellular Band (Part 22H) result



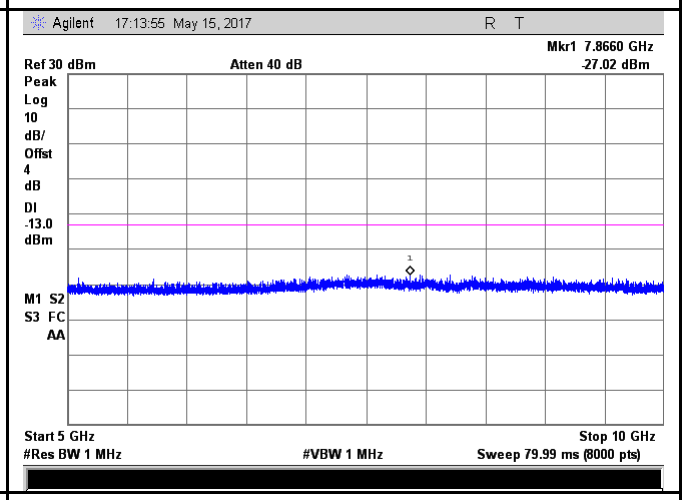
GSM 850 - Low Channel-1



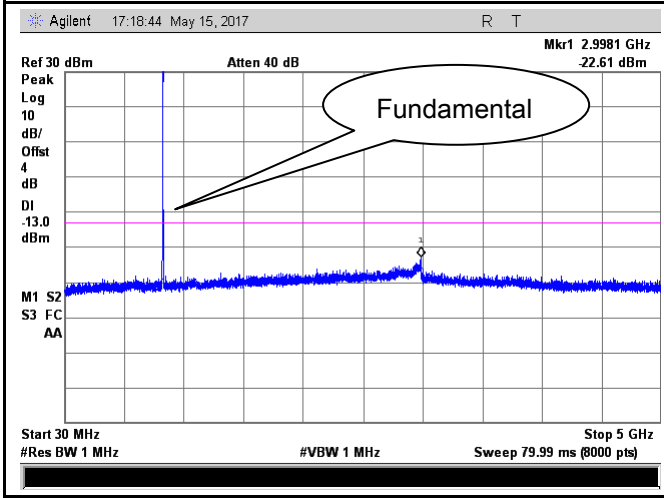
GSM 850 - Low Channel-2



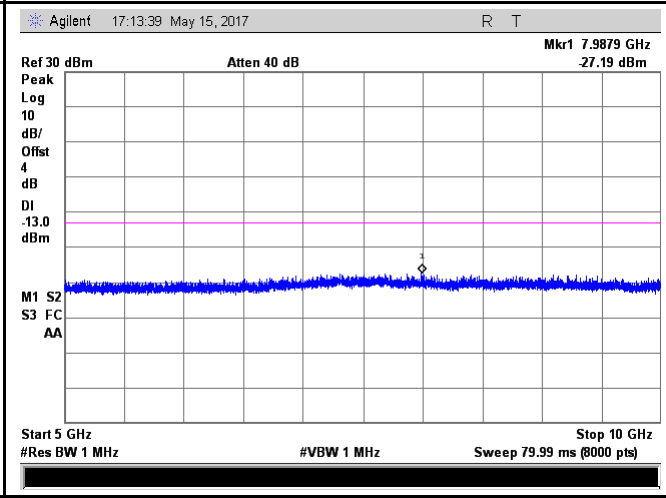
GSM 850 Middle Channel-1



GSM 850 Middle Channel-2

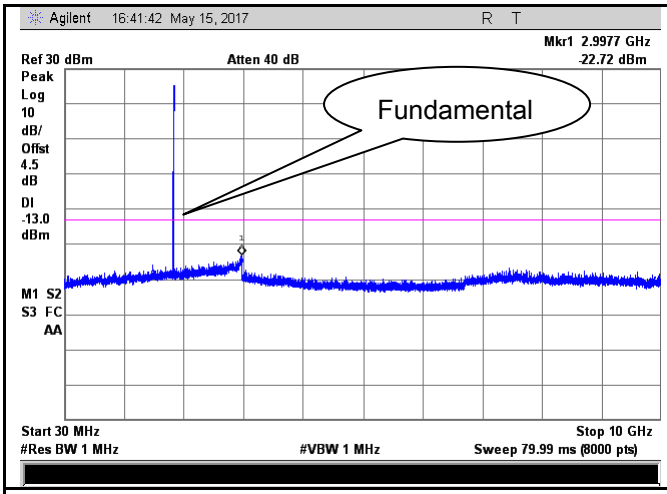


GSM 850 - High Channel-1

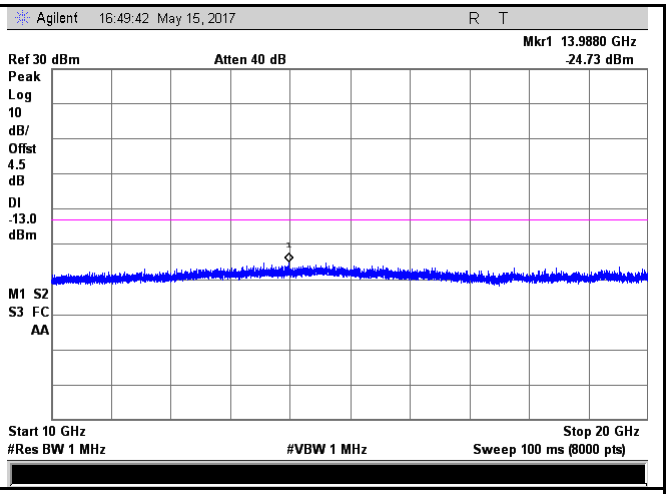


GSM 850 - High Channel-2

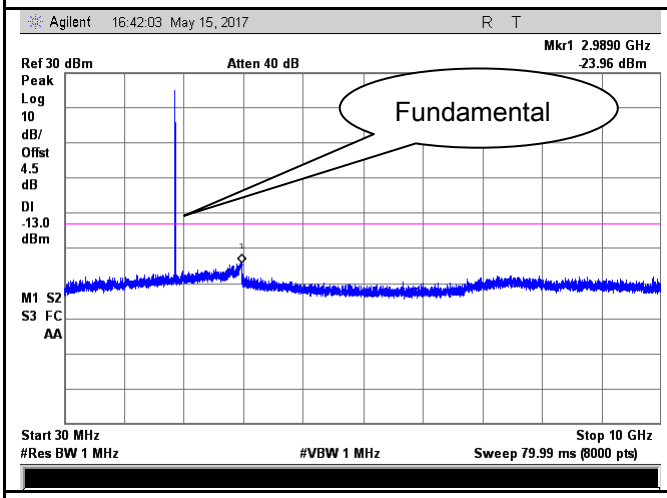
PCS Band (Part24E) result



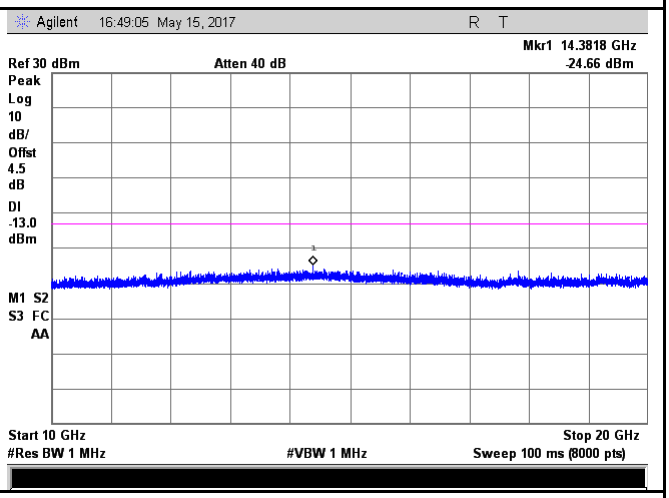
PCS1900 - Low Channel-1



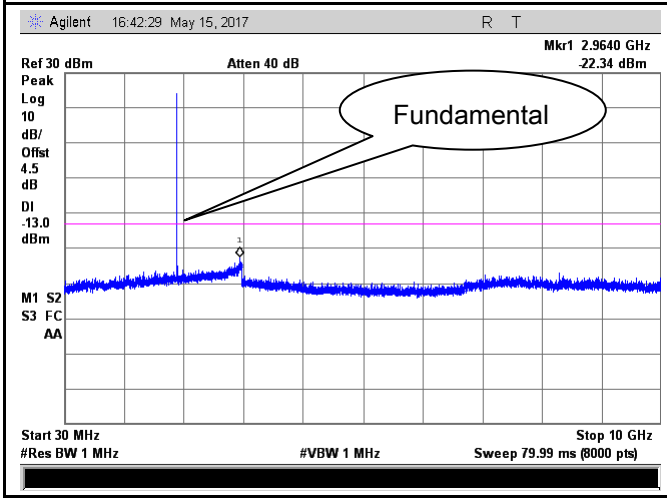
PCS 1900 - Low Channel-2



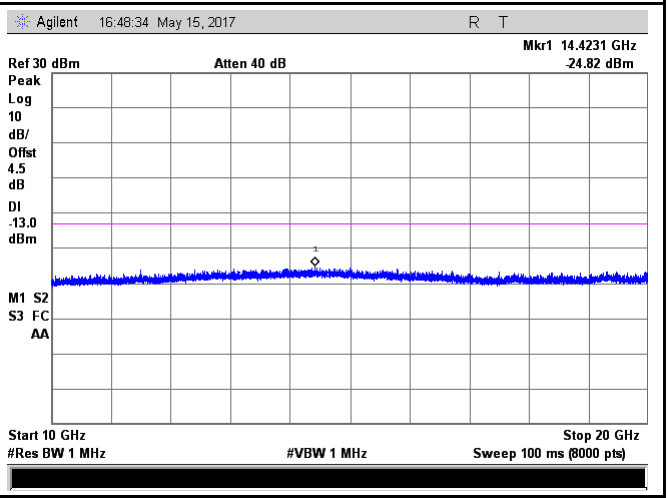
PCS1900 - Middle Channel-1



PCS 1900 - Middle Channel-2



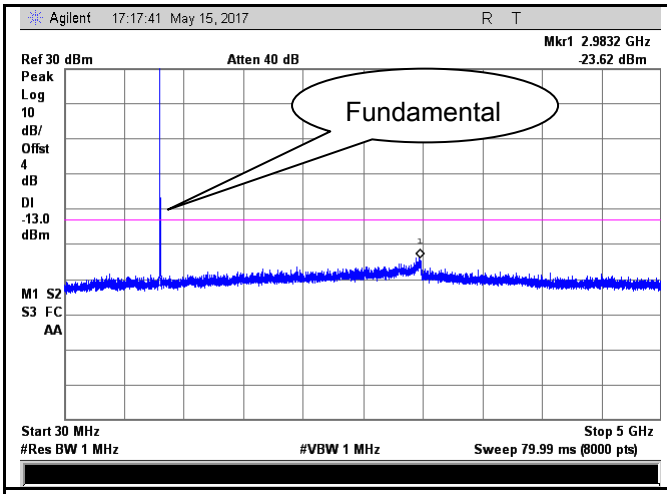
PCS1900 - High Channel-1



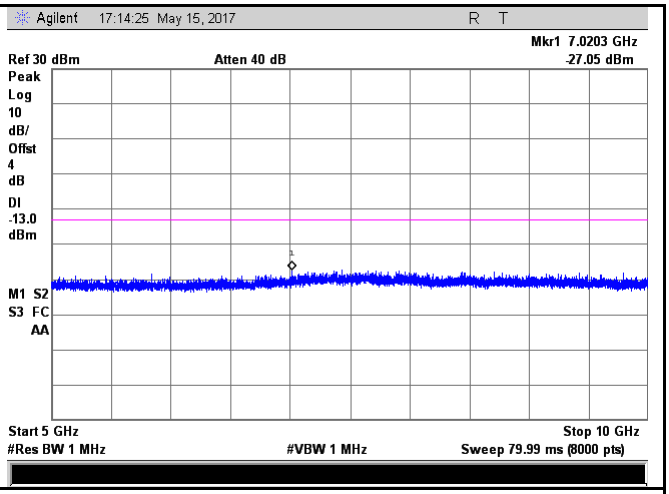
PCS 1900 - High Channel-2

EGPRS (MSC 1):

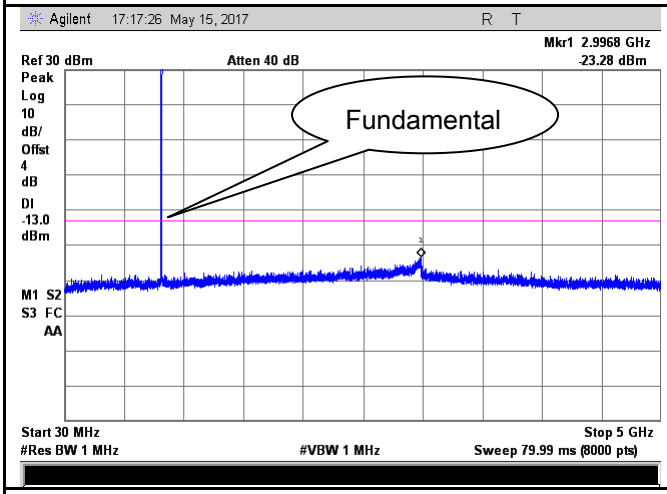
Cellular Band (Part 22H) result



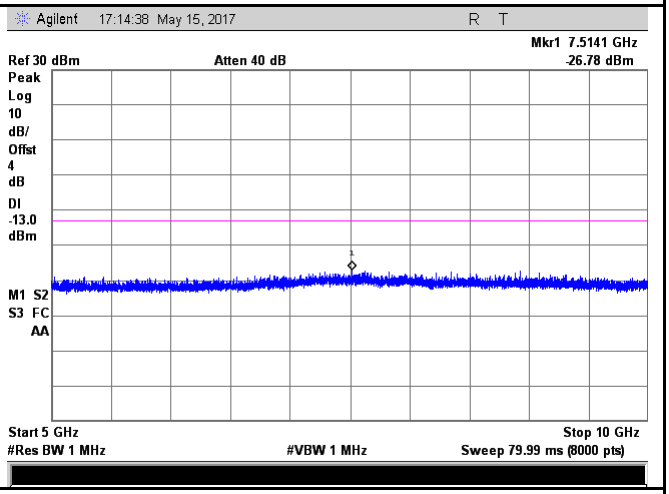
GSM 850 - Low Channel-1



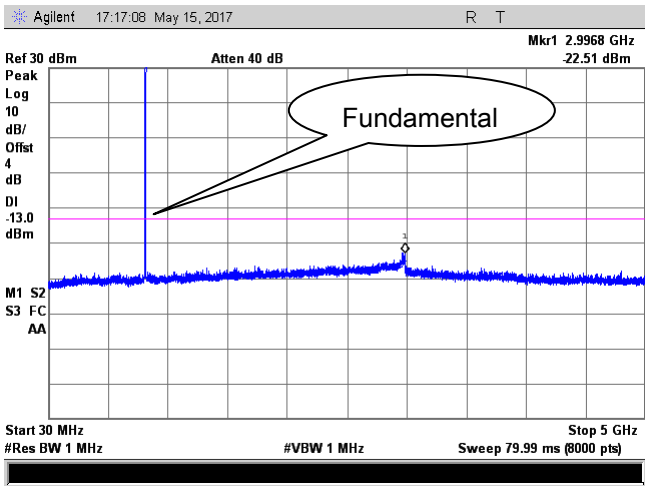
GSM 850 - Low Channel-2



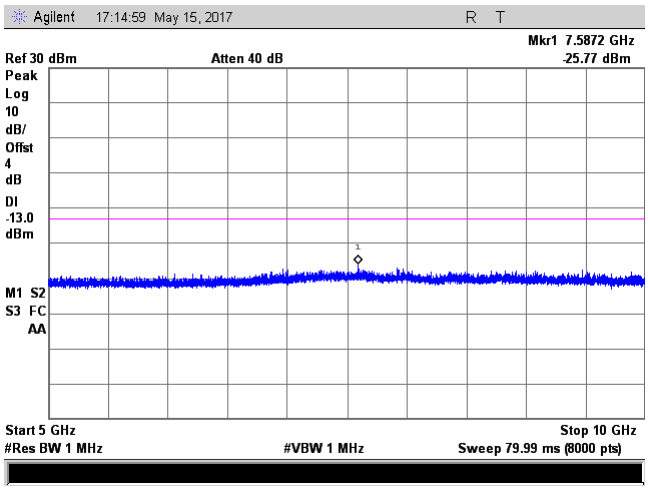
GSM 850 Middle Channel-1



GSM 850 Middle Channel-2

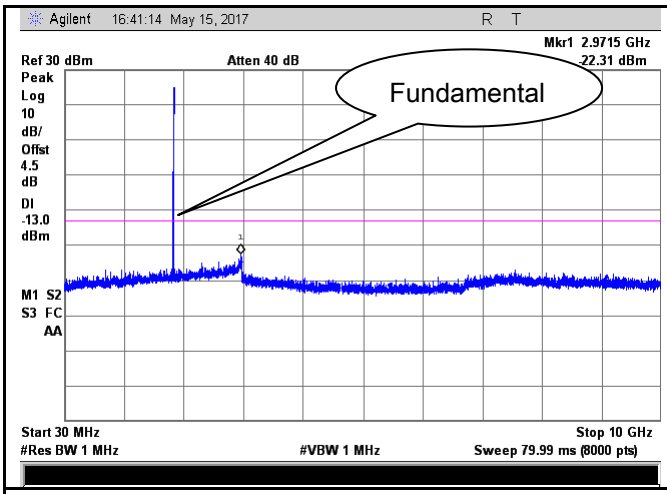


GSM 850 - High Channel-1

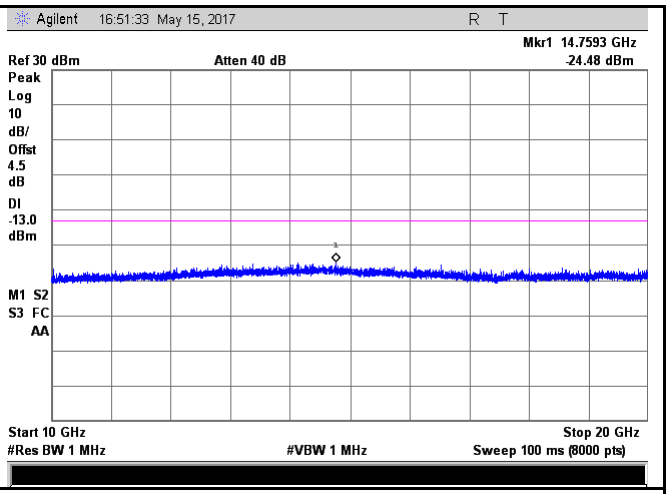


GSM 850 - High Channel-2

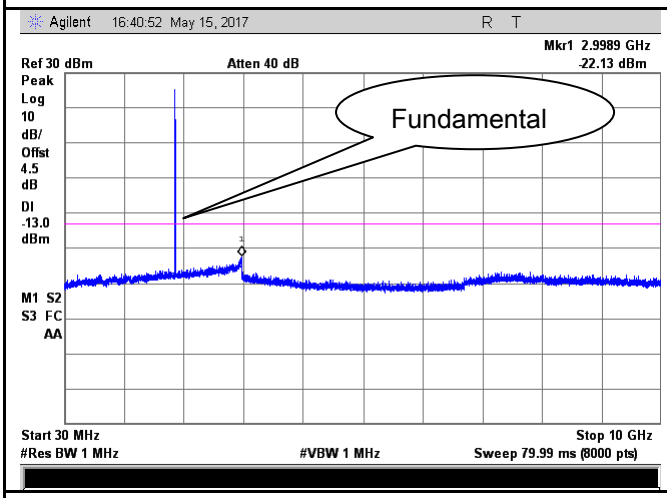
PCS Band (Part24E) result



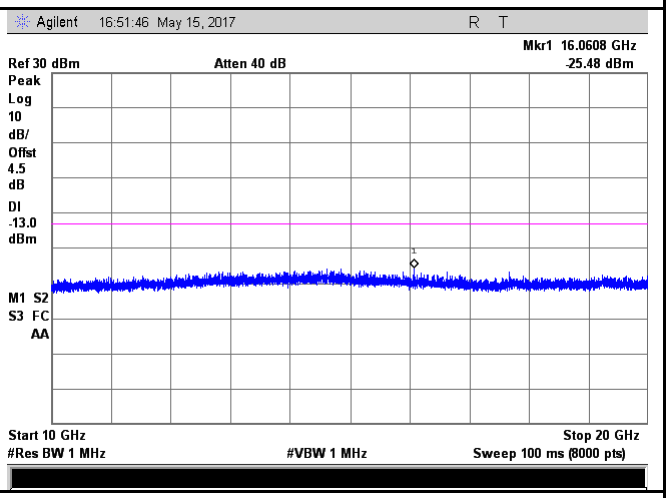
PCS1900 - Low Channel-1



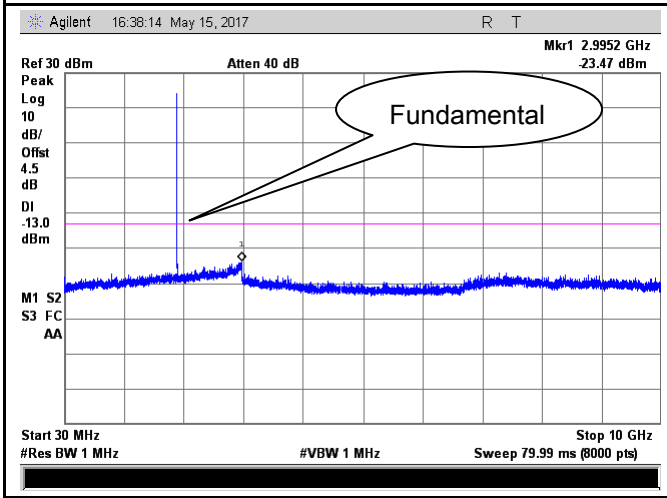
PCS 1900 - Low Channel-2



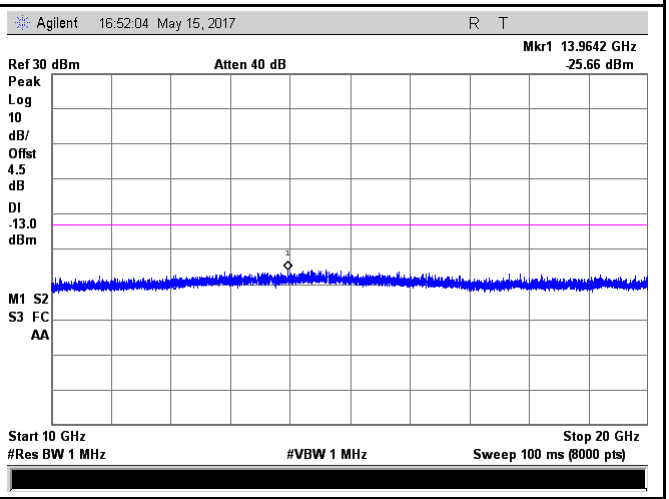
PCS1900 - Middle Channel-1



PCS 1900 - Middle Channel-2



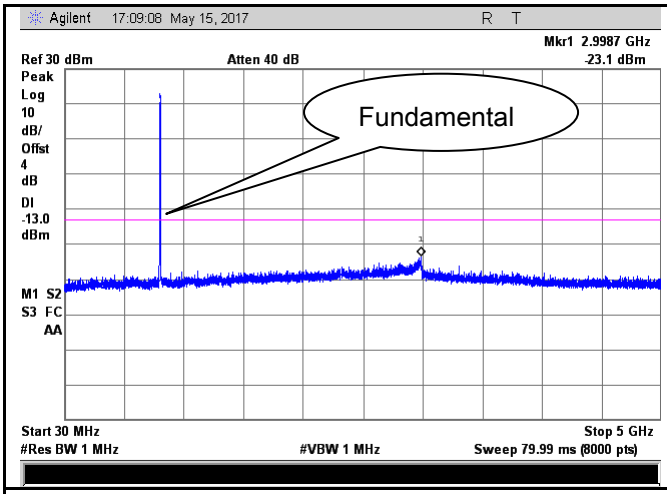
PCS1900 - High Channel-1



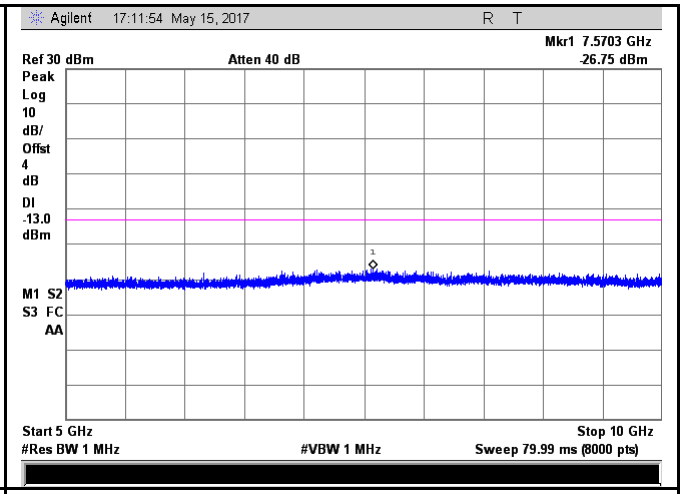
PCS 1900 - High Channel-2

RMC

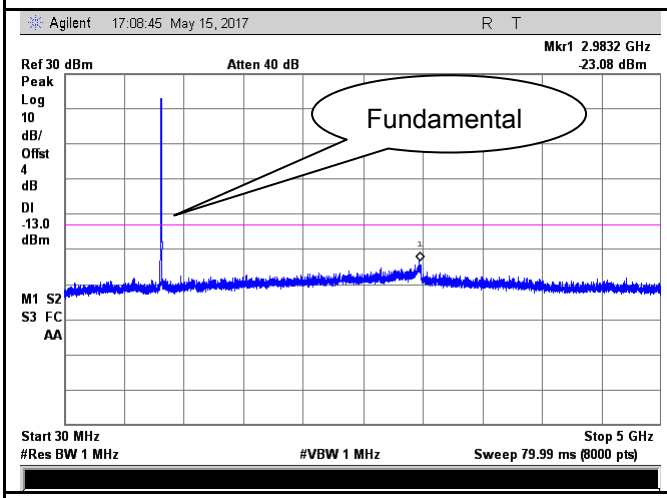
UMTS-FDD Band V (Part 22H)



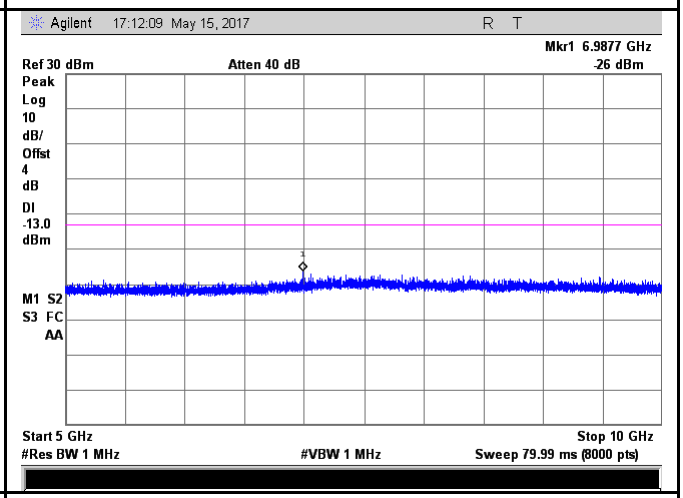
Band V - Low Channel-1



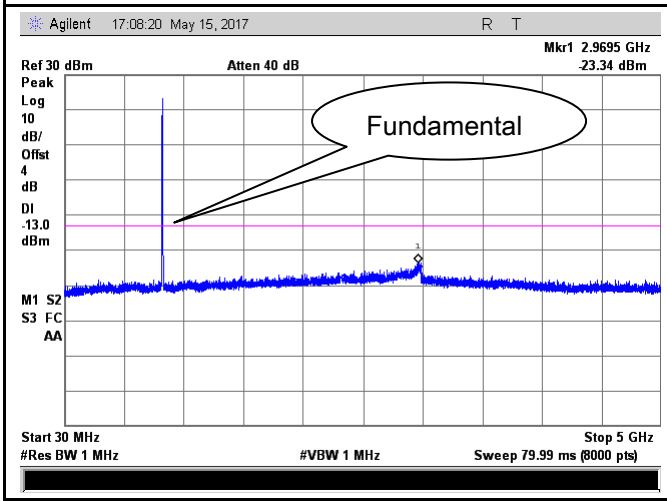
Band V - Low Channel-2



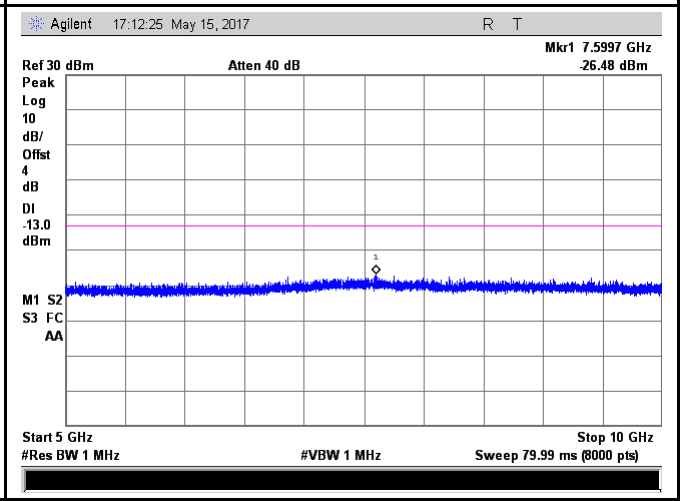
Band V - Middle Channel-1



Band V - Middle Channel-2

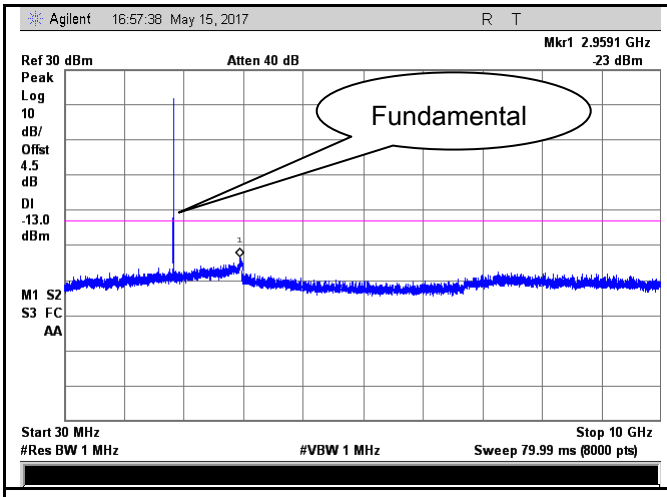


Band V - High Channel-1

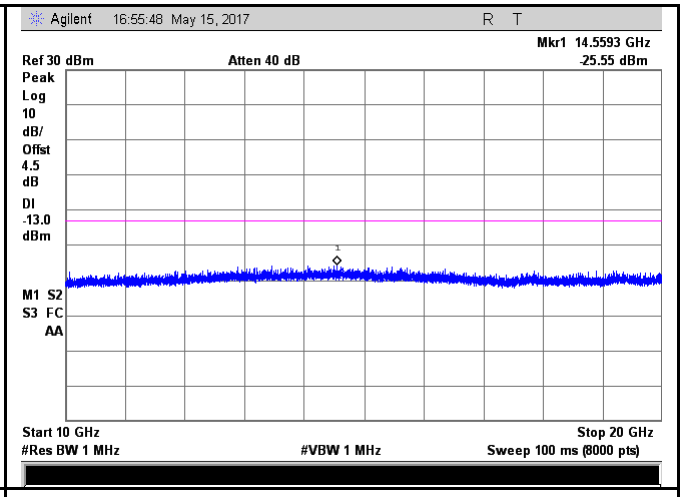


Band V - High Channel-2

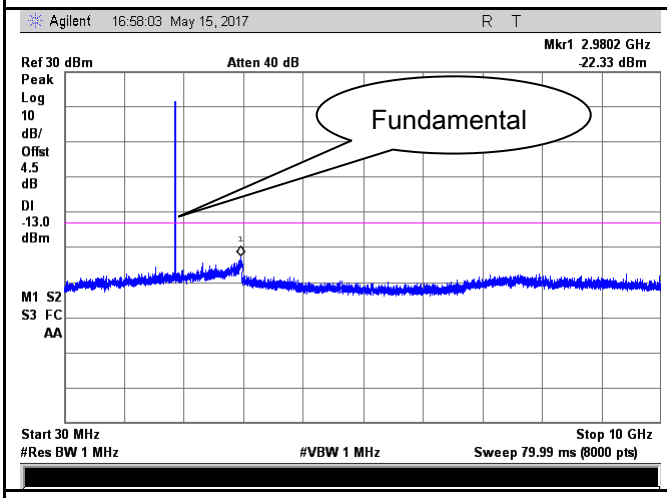
UMTS-FDD Band II (Part 24E)



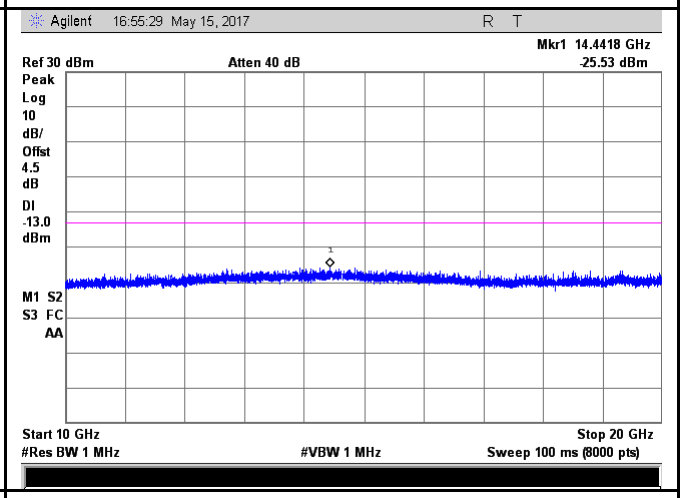
Band II - Low Channel-1



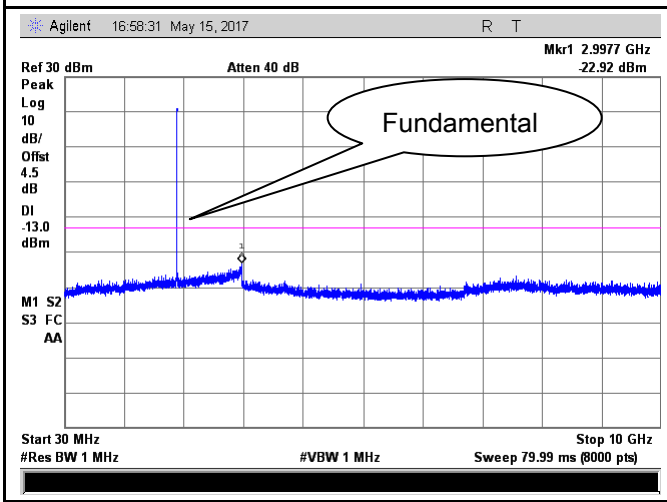
Band II - Low Channel-2



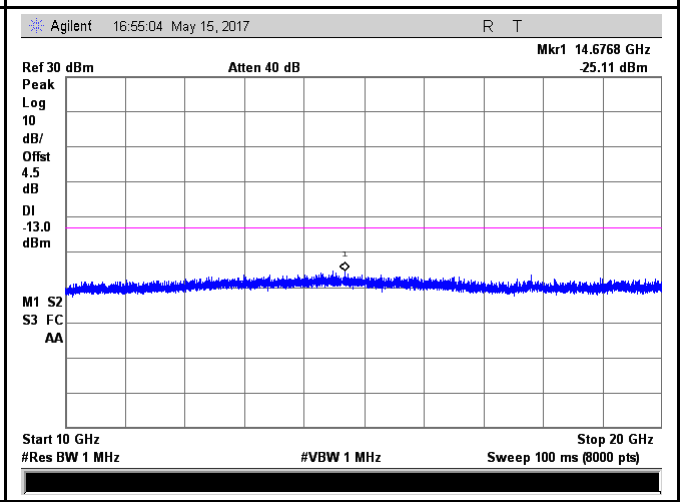
Band II - Middle Channel-1



Band II - Middle Channel-2



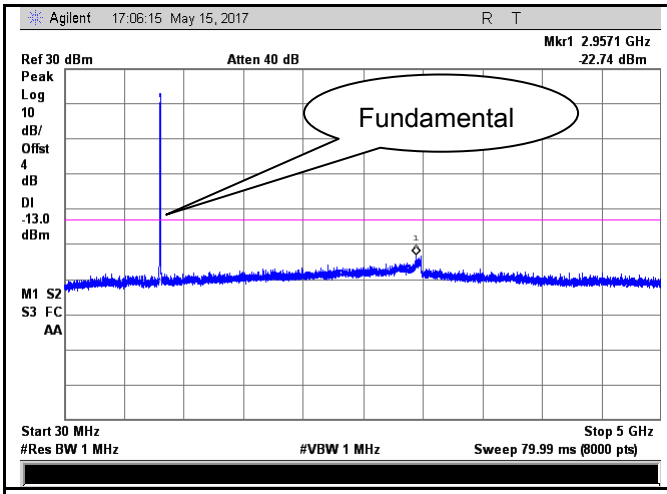
Band II - High Channel-1



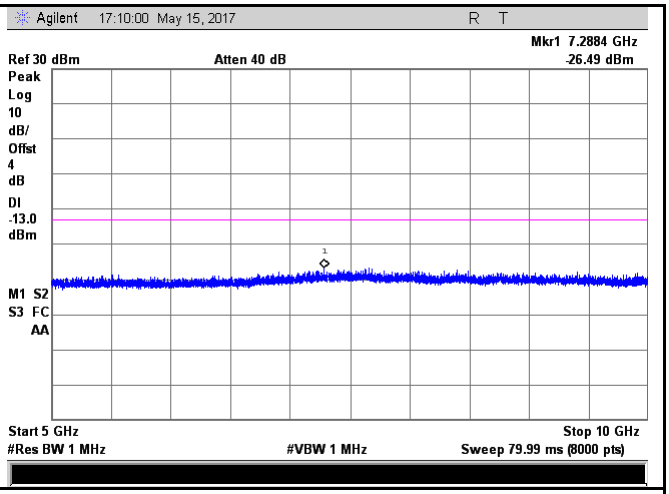
Band II - High Channel-2

HSDPA:

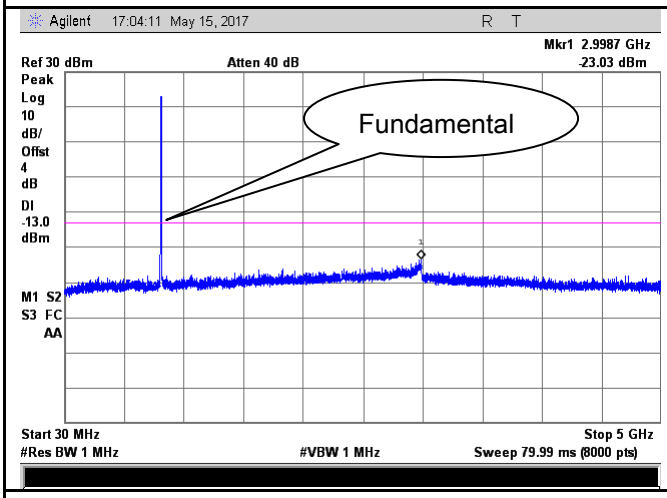
UMTS-FDD Band V (Part 22H)



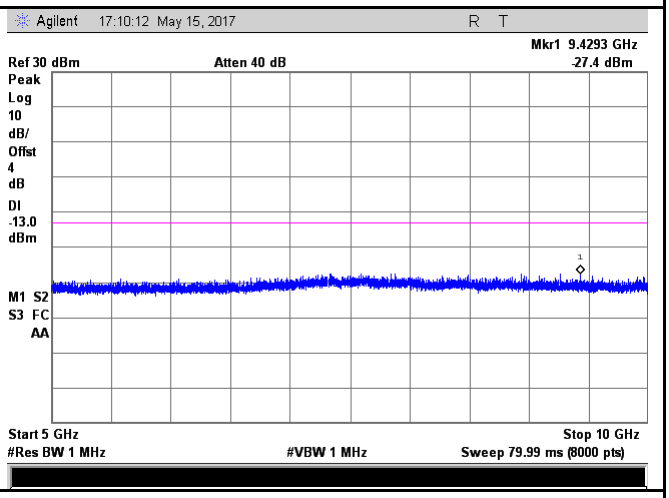
Band V - Low Channel-1



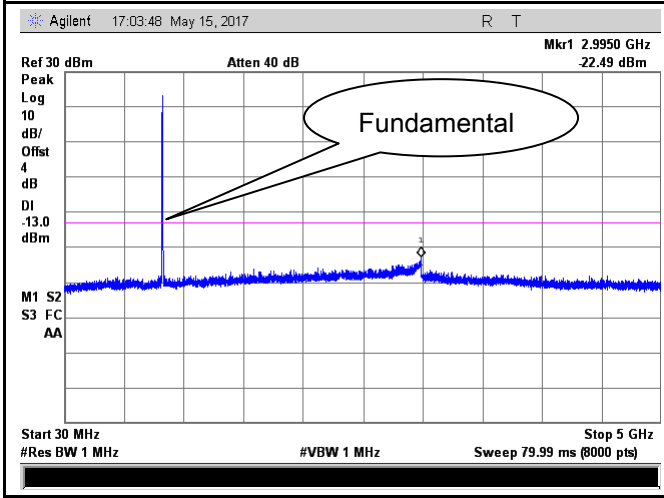
Band V - Low Channel-2



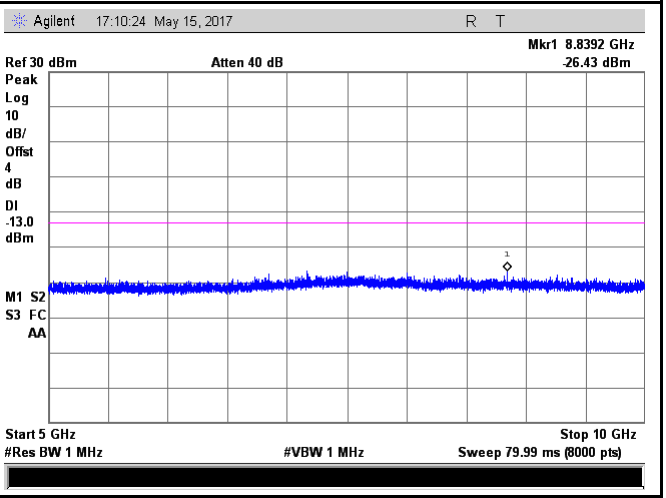
Band V - Middle Channel-1



Band V - Middle Channel-2

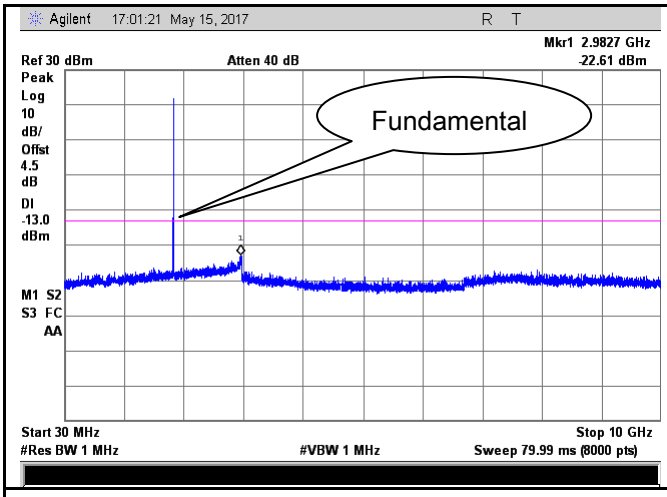


Band V - High Channel-1

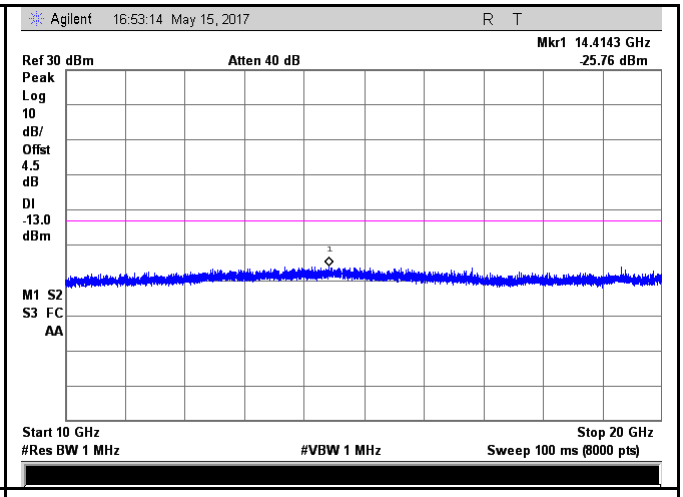


Band V - High Channel-2

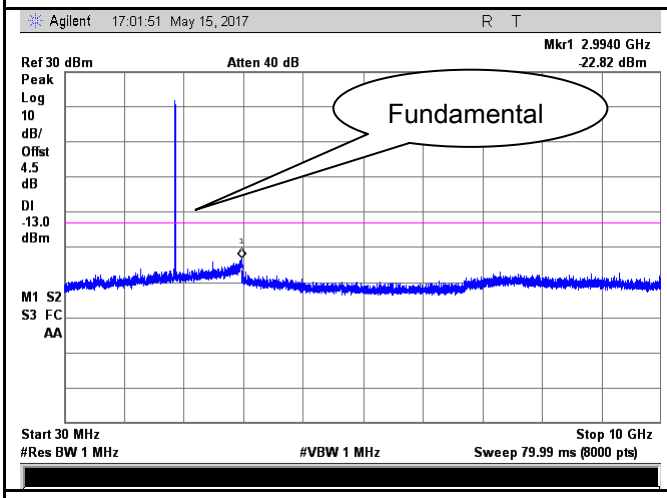
UMTS-FDD Band II (Part 24E)



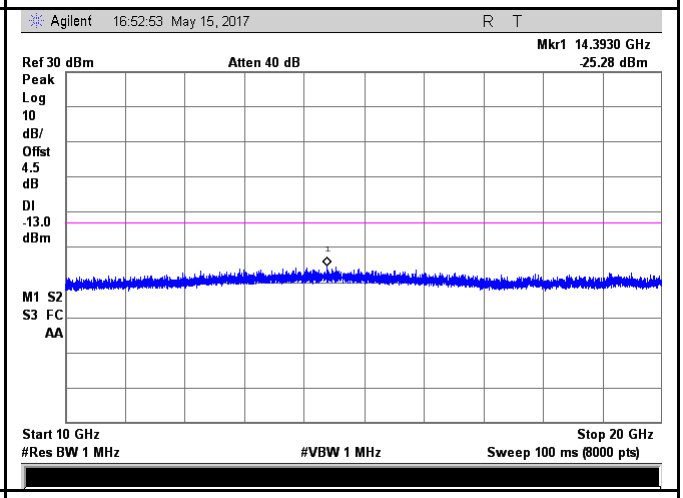
Band II - Low Channel-1



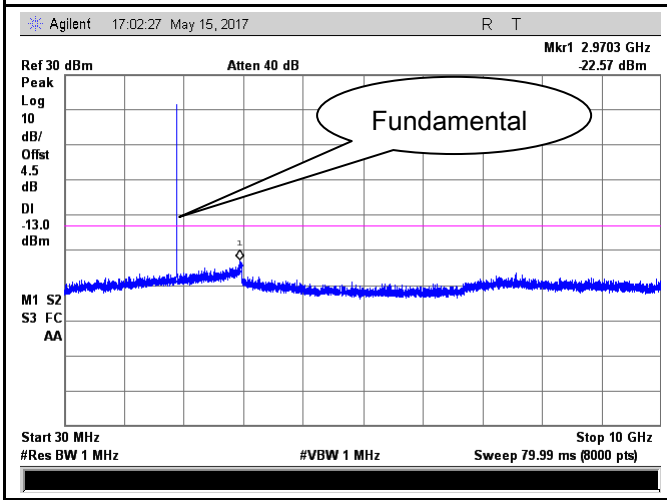
Band II - Low Channel-2



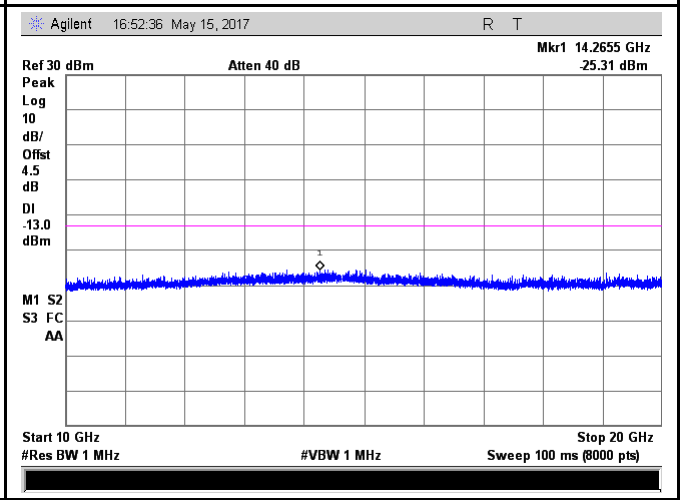
Band II - Middle Channel-1



Band II - Middle Channel-2



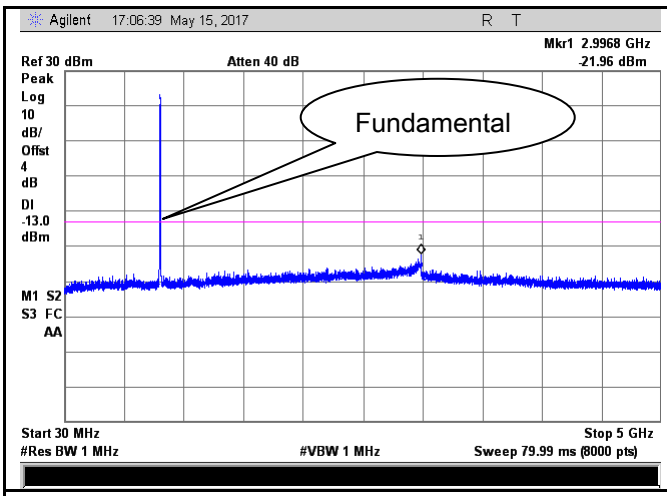
Band II - High Channel-1



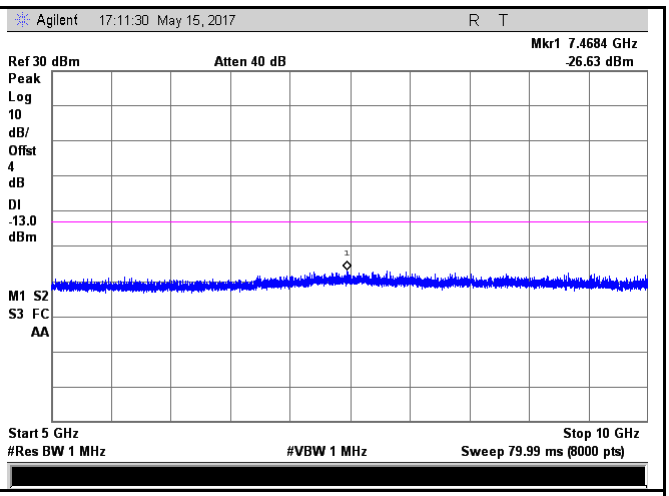
Band II - High Channel-2

HSUPA:

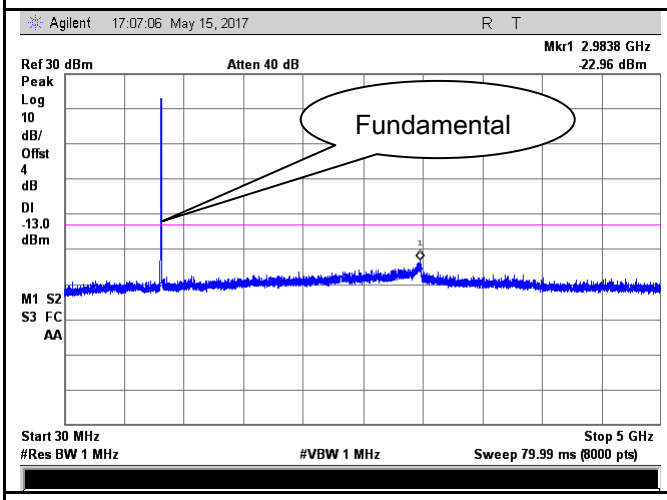
UMTS-FDD Band V (Part 22H)



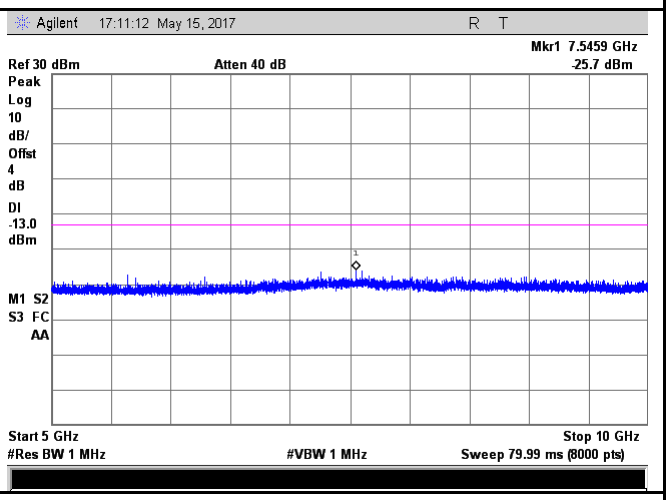
Band V - Low Channel-1



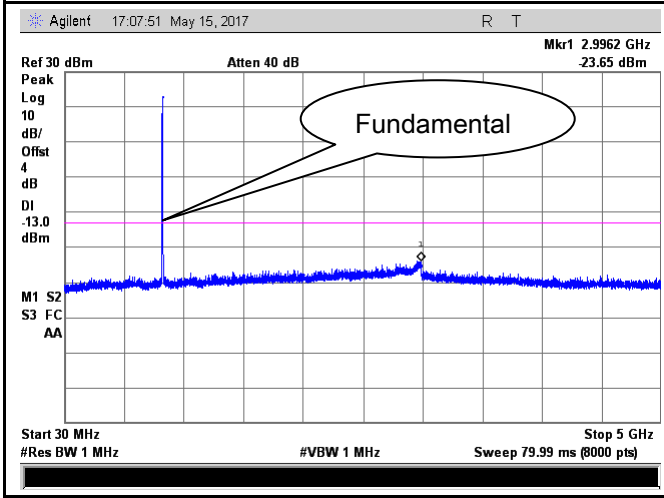
Band V - Low Channel-2



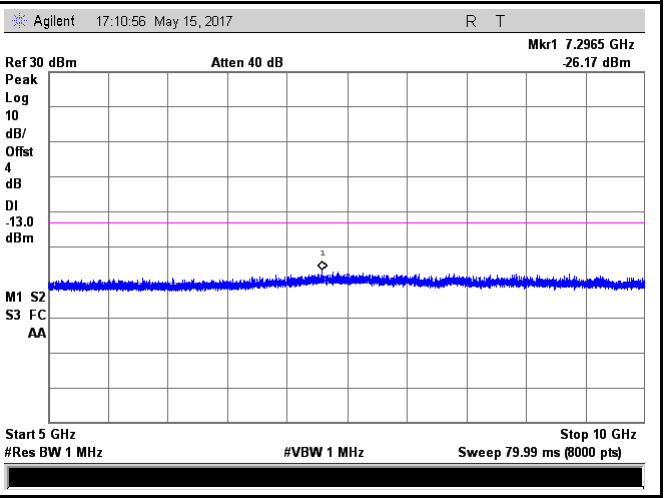
Band V - Middle Channel-1



Band V - Middle Channel-2

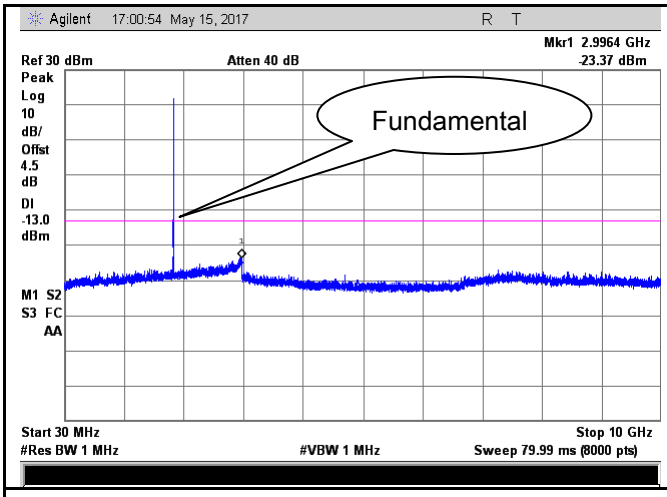


Band V - High Channel-1

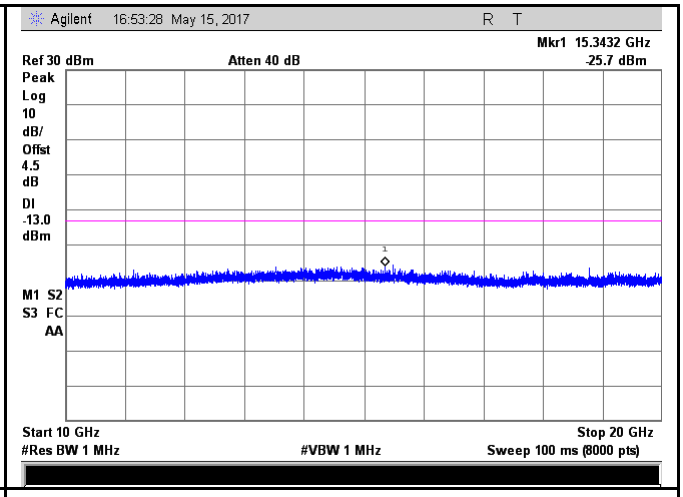


Band V - High Channel-2

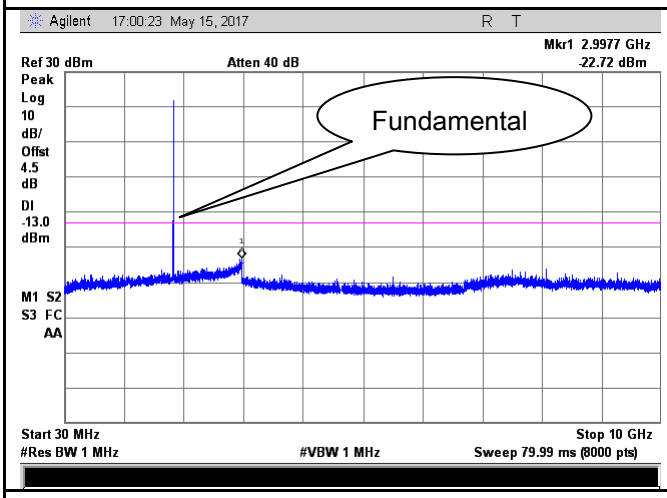
UMTS-FDD Band II (Part 24E)



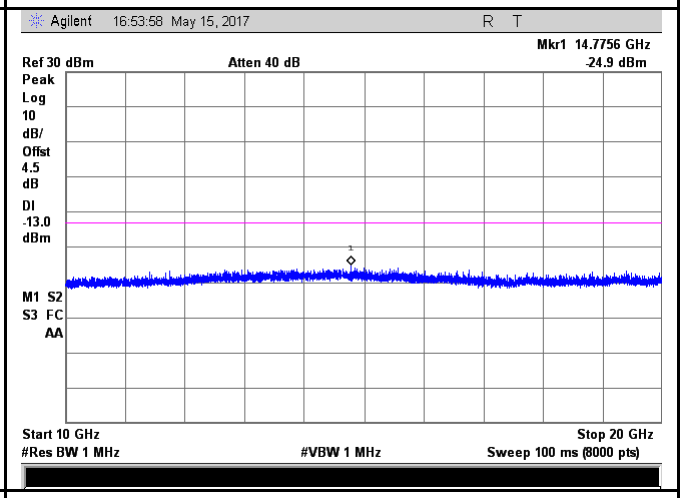
Band II - Low Channel-1



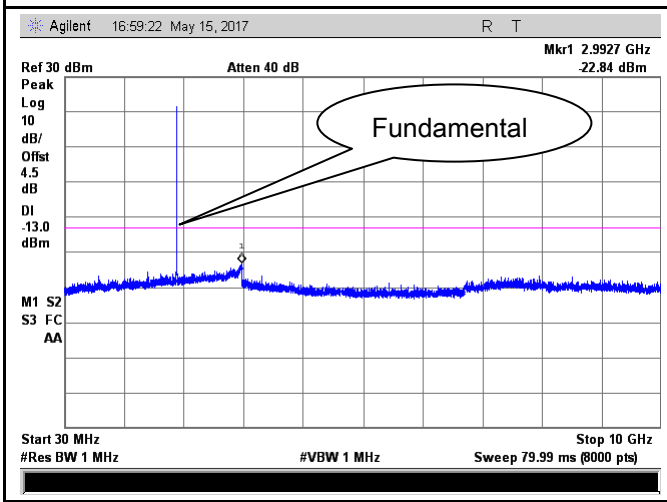
Band II - Low Channel-2



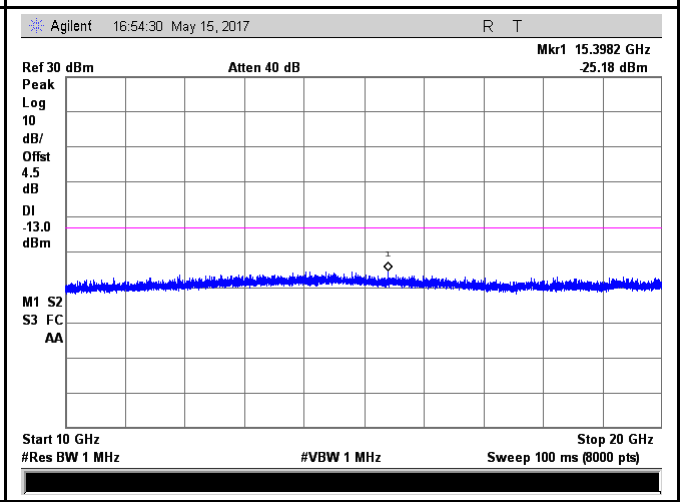
Band II - Middle Channel-1



Band II - Middle Channel-2



Band II - High Channel-1

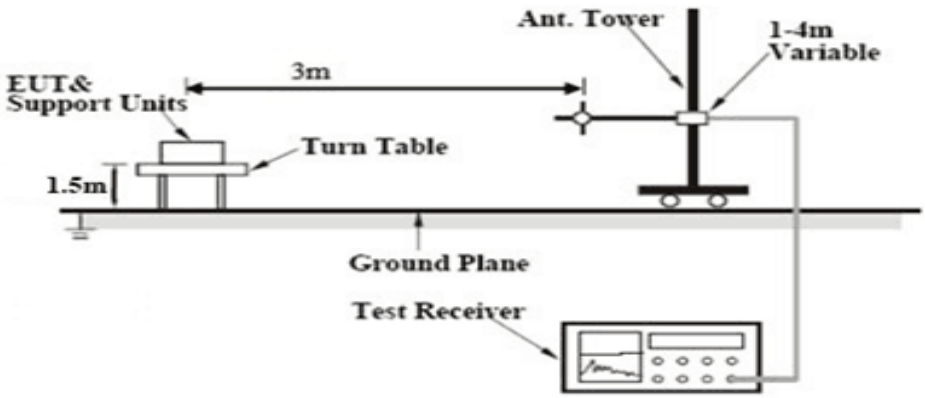


Band II - High Channel-2

6.6 Spurious Radiated Emissions

Temperature	22℃
Relative Humidity	55%
Atmospheric Pressure	1013mbar
Test date :	May 15, 2017
Tested By :	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			
Test Procedure	1. The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable. 2. 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. 3. 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)		

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	-43.67	V	7.95	0.78	-36.5	-13	-23.50
1648.4	-44.22	H	7.95	0.78	-37.05	-13	-24.05
323.5	-52.76	V	6.4	0.26	-46.62	-13	-33.62
606.9	-52.93	H	6.8	0.37	-46.5	-13	-33.50

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	-43.55	V	7.95	0.78	-36.38	-13	-23.38
1673.2	-44.09	H	7.95	0.78	-36.92	-13	-23.92
325.1	-52.68	V	6.4	0.26	-46.54	-13	-33.54
606.4	-52.79	H	6.8	0.37	-46.36	-13	-33.36

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	-43.61	V	7.95	0.78	-36.44	-13	-23.44
1697.6	-44.02	H	7.95	0.78	-36.85	-13	-23.85
323.8	-52.85	V	6.4	0.26	-46.71	-13	-33.71
605.7	-52.83	H	6.8	0.37	-46.4	-13	-33.40

Note:

*1, The testing has been conformed to 10*848.8MHz=8,488MHz*
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	-48.82	V	10.25	2.73	-41.3	-13	-28.30
3700.4	-49.31	H	10.25	2.73	-41.79	-13	-28.79
326.2	-53.54	V	6.4	0.26	-47.4	-13	-34.40
604.5	-53.89	H	6.8	0.37	-47.46	-13	-34.46

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	-48.78	V	10.25	2.73	-41.26	-13	-28.26
3760	-49.56	H	10.25	2.73	-42.04	-13	-29.04
326.6	-53.33	V	6.4	0.26	-47.19	-13	-34.19
604.8	-53.86	H	6.8	0.37	-47.43	-13	-34.43

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	-48.86	V	10.36	2.73	-41.23	-13	-28.23
3819.6	-49.55	H	10.36	2.73	-41.92	-13	-28.92
326.4	-53.71	V	6.4	0.26	-47.57	-13	-34.57
604.9	-52.23	H	6.8	0.37	-45.8	-13	-32.80

Note:

*1, The testing has been conformed to 10*1909.8MHz=19,098MHz*
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	-46.65	V	7.95	0.78	-39.48	-13	-26.48
1652.8	-45.83	H	7.95	0.78	-38.66	-13	-25.66
322.2	-52.77	V	6.4	0.26	-46.63	-13	-33.63
608.5	-53.36	H	6.8	0.37	-46.93	-13	-33.93

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	-46.71	V	7.95	0.78	-39.54	-13	-26.54
1670	-45.82	H	7.95	0.78	-38.65	-13	-25.65
322.6	-52.63	V	6.4	0.26	-46.49	-13	-33.49
608..9	-53.04	H	6.8	0.37	-46.61	-13	-33.61

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	-46.69	V	7.95	0.78	-39.52	-13	-26.52
1693.2	-45.81	H	7.95	0.78	-38.64	-13	-25.64
322.5	-52.76	V	6.4	0.26	-46.62	-13	-33.62
608.1	-53.33	H	6.8	0.37	-46.9	-13	-33.90

Note:

*1, The testing has been conformed to 10*846.6MHz=8,466MHz*
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	-49.58	V	10.25	2.73	-42.06	-13	-29.06
3704.8	-50.02	H	10.25	2.73	-42.5	-13	-29.50
327.3	-53.55	V	6.4	0.26	-47.41	-13	-34.41
603.5	-53.42	H	6.8	0.37	-46.99	-13	-33.99

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	-49.61	V	10.25	2.73	-42.09	-13	-29.09
3760	-49.89	H	10.25	2.73	-42.37	-13	-29.37
327.9	-53.62	V	6.4	0.26	-47.48	-13	-34.48
604.4	-53.57	H	6.8	0.37	-47.14	-13	-34.14

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	-49.75	V	10.36	2.73	-42.12	-13	-29.12
3815.2	-49.92	H	10.36	2.73	-42.29	-13	-29.29
327.1	-53.61	V	6.4	0.26	-47.47	-13	-34.47
604.7	-53.76	H	6.8	0.37	-47.33	-13	-34.33

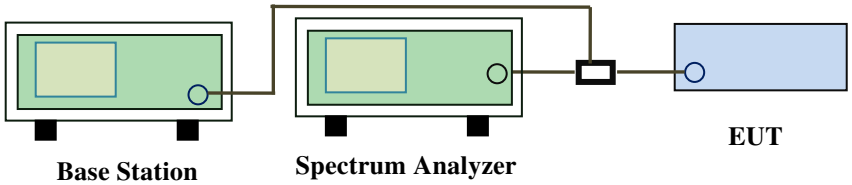
Note:

*1, The testing has been conformed to 10*1907.6MHz=19,076MHz*
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	22℃
Relative Humidity	55%
Atmospheric Pressure	1013mbar
Test date :	May 15 to 23, 2017
Tested By :	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			
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)
823.9800	-16.42	-13
849.0175	-17.54	-13

PCS Band (Part24E) result

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1849.997	-17.74	-13
1910.020	-15.19	-13

GPRS:

Cellular Band (Part 22H) result

Frequency (MHz)	Emission (dBm)	Limit (dBm)
823.9750	-16.38	-13
849.0175	-16.35	-13

PCS Band (Part24E) result

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1849.993	-19.56	-13
1910.015	-16.68	-13

EGPRS (MSC1):

Cellular Band (Part 22H) result

Frequency (MHz)	Emission (dBm)	Limit (dBm)
823.9775	-15.85	-13
849.0175	-15.76	-13

PCS Band (Part24E) result

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1849.993	-17.85	-13
1910.003	-16.35	-13

RMC:

UMTS-FDD Band V (Part 22H)

Frequency (MHz)	Emission (dBm)	Limit (dBm)
823.975	-21.03	-13
849.300	-21.56	-13

UMTS-FDD Band II (Part 24E)

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1849.975	-20.22	-13
1910.175	-24.64	-13

HSDPA:

UMTS-FDD Band V (Part 22H)

Frequency (MHz)	Emission (dBm)	Limit (dBm)
823.975	-21.95	-13
849.025	-21.56	-13

UMTS-FDD Band II (Part 24E)

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1849.950	-19.74	-13
1910.025	-24.15	-13

HSUPA:

UMTS-FDD Band V (Part 22H)

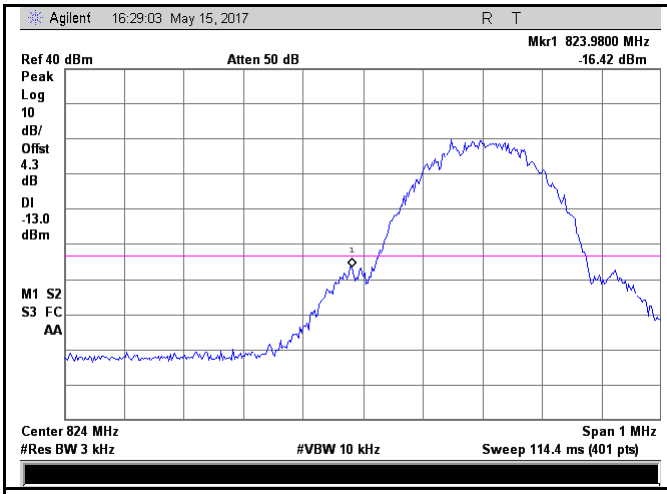
Frequency (MHz)	Emission (dBm)	Limit (dBm)
823.975	-21.29	-13
849.250	-20.61	-13

UMTS-FDD Band II (Part 24E)

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1849.975	-18.02	-13
1910.225	-23.71	-13

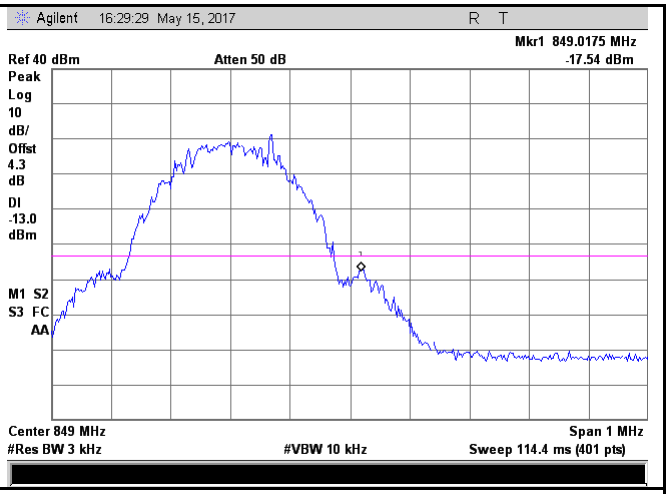
GSM Voice:

Test Plots



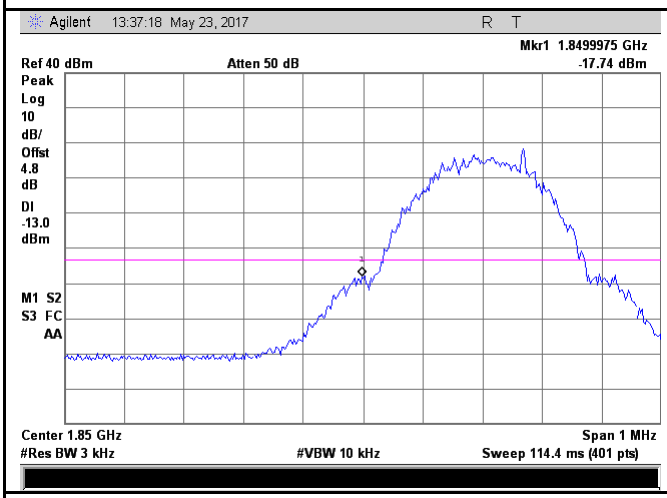
Cellular Band - Low Channel

Note: Offset=Cable loss (4.0) + 10log (3.22/3)=4.0+0.3=4.3dB



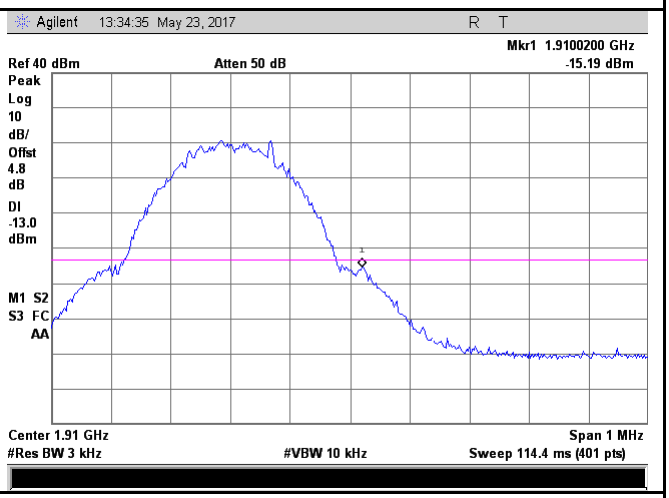
Cellular Band - High Channel

Note: Offset=Cable loss (4.0) + 10log (3.24/3)=4.0+0.3=4.3dB



PCS Band - Low Channel

Note: Offset=Cable loss (4.0) + 10log (3.18/3)=4.5+0.3=4.8dB

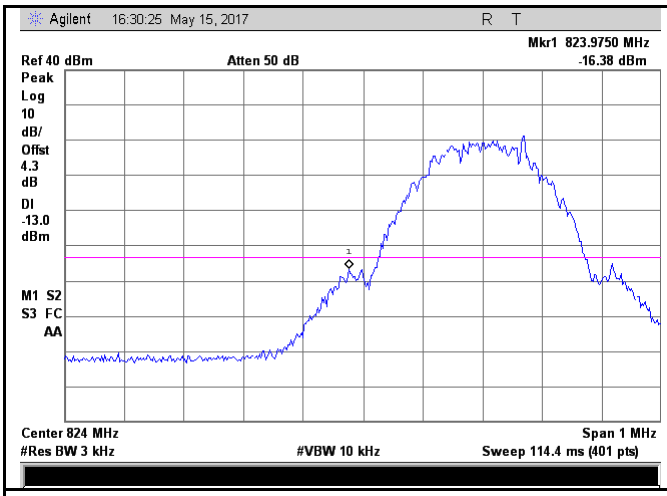


PCS Band - High Channel

Note: Offset=Cable loss (4.0) + 10log (3.18/3)=4.5+0.3=4.8dB

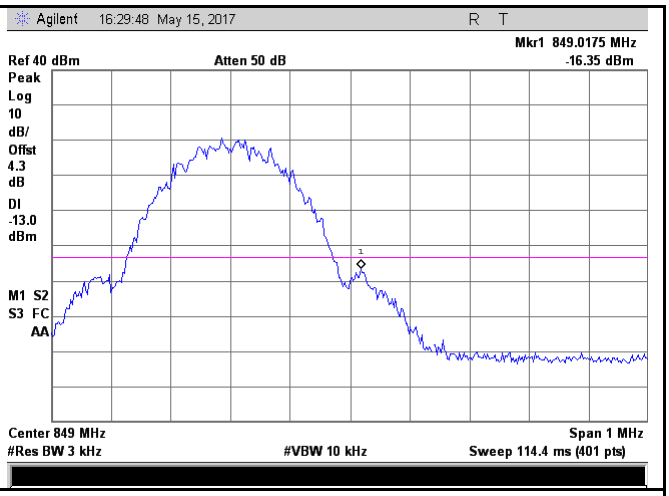
GPRS:

Test Plots



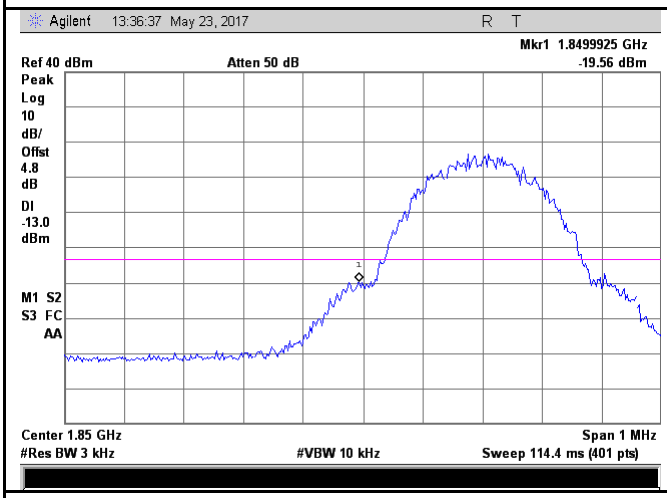
Cellular Band - Low Channel

Note: Offset=Cable loss (4.0) + 10log (3.18/3)=4.0+0.3=4.3dB



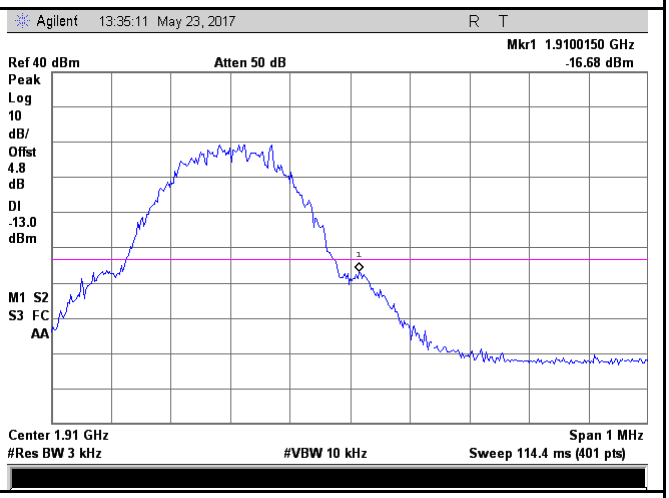
Cellular Band - High Channel

Note: Offset=Cable loss (4.0) + 10log (3.18/3)=4.0+0.3=4.3dB



PCS Band - Low Channel

Note: Offset=Cable loss (4.5) + 10log (3.20/3)=4.5+0.3=4.8dB

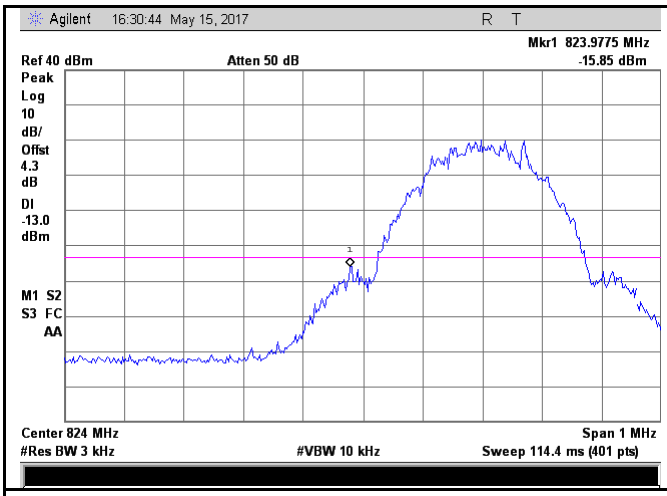


PCS Band - High Channel

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

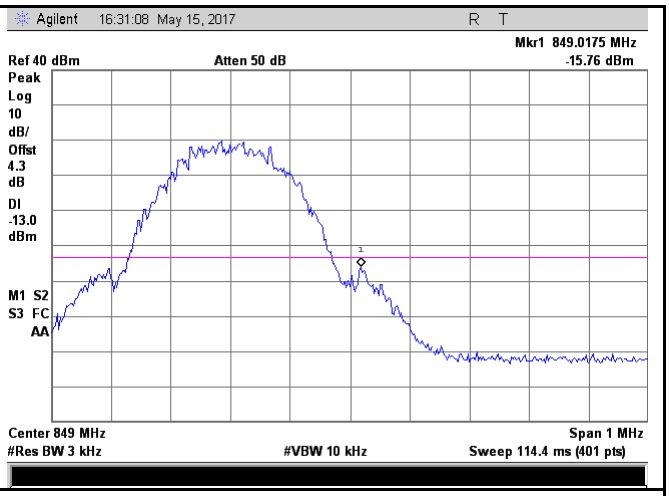
EGPRS (MSC1):

Test Plots



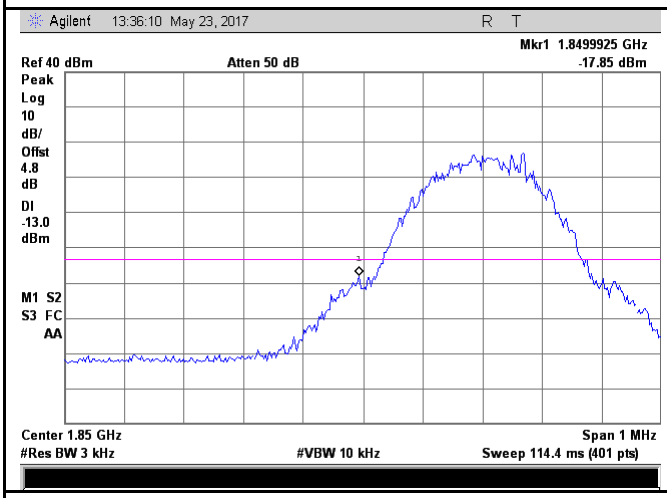
Cellular Band - Low Channel

Note: Offset=Cable loss (4.0) + 10log (3.22/3)=4.0+0.3=4.3dB



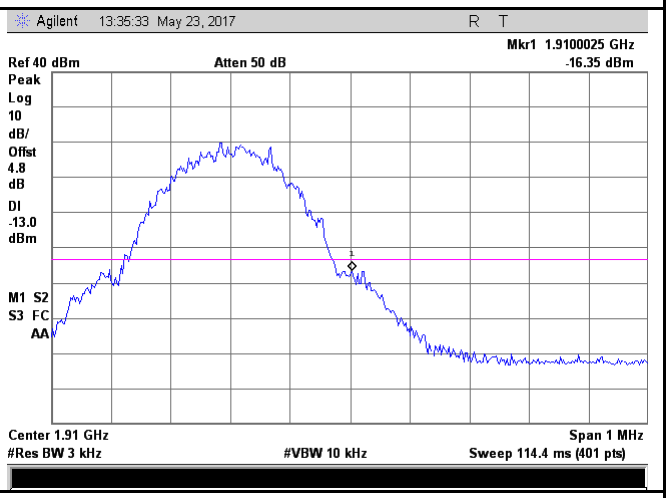
Cellular Band - High Channel

Note: Offset=Cable loss (4.0) + 10log (3.20/3)=4.0+0.3=4.3dB



PCS Band - Low Channel

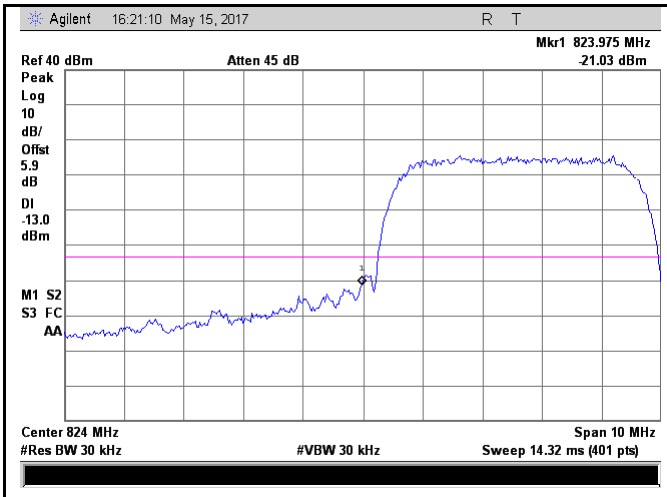
Note: Offset=Cable loss (4.5) + 10log (3.19/3)=4.5+0.3=4.8dB



PCS Band - High Channel

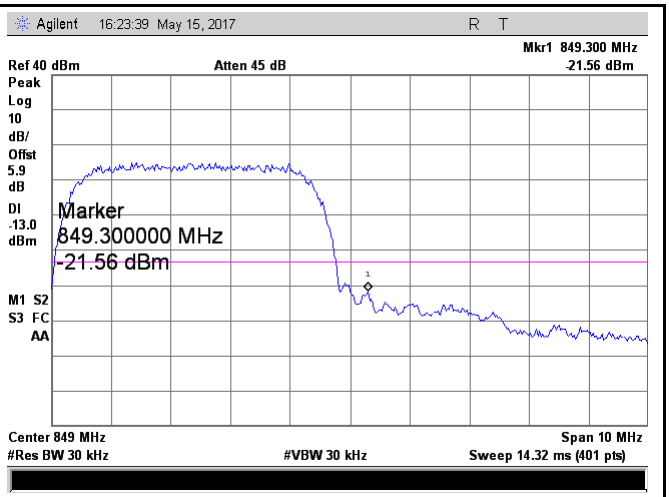
Note: Offset=Cable loss (4.5) + 10log (3.21/3)=4.5+0.3=4.8dB

RMC:



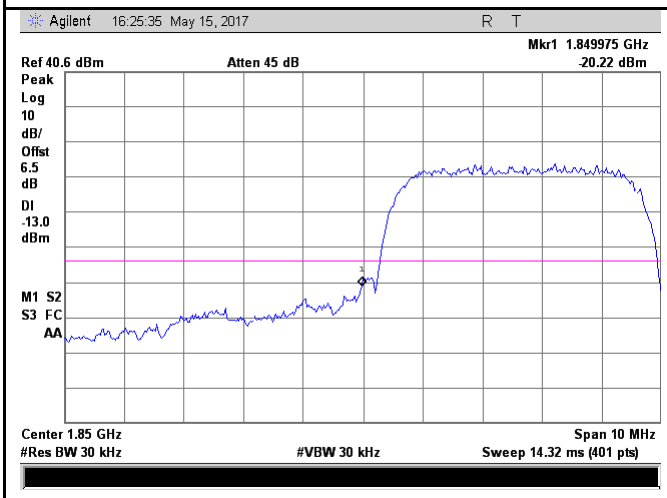
UMTS-FDD Band V - Low Channel

Note: Offset=Cable loss (4.0) + 10log (46.65/30)=4.0+1.9=5.9 dB



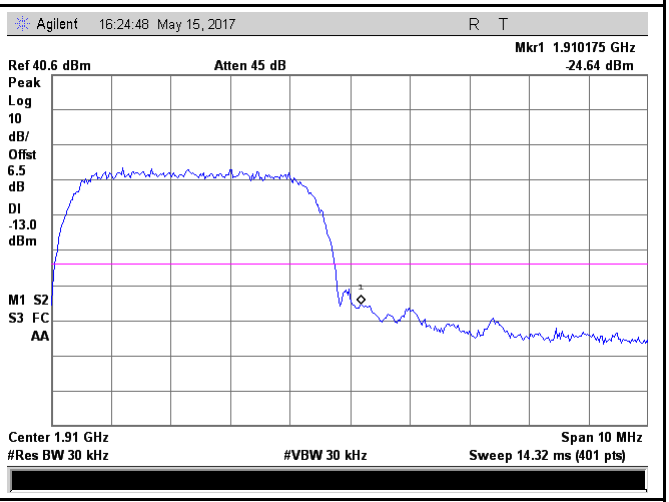
UMTS-FDD Band V - High Channel

Note: Offset=Cable loss (4.0) + 10log (46.91/30)=4.0+1.9=5.9dB



UMTS-FDD Band II - Low Channel

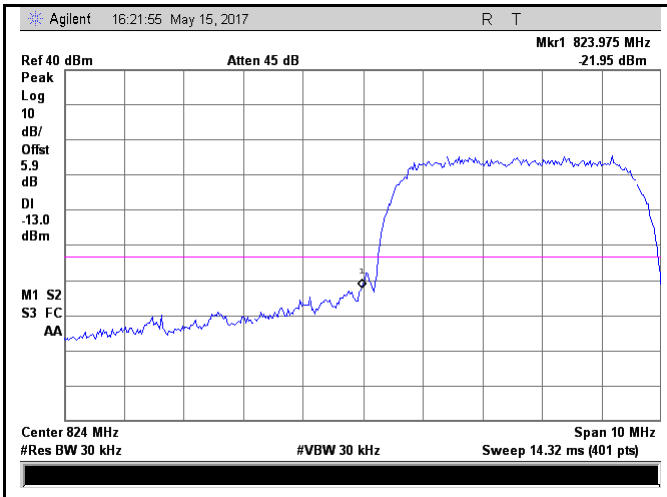
Note: Offset=Cable loss (4.5) + 10log (47.01/30)=4.5+2.0=6.5 dB



UMTS-FDD Band II - High Channel

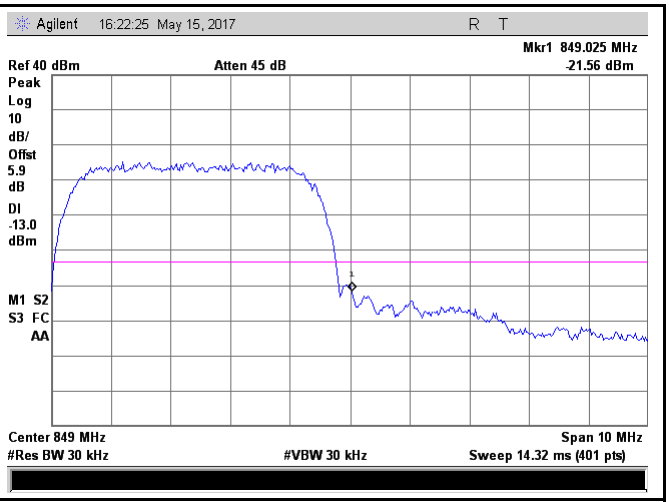
Note: Offset=Cable loss (4.5) + 10log (47.12/30)=4.5+2.0=6.5 dB

HSDPA:



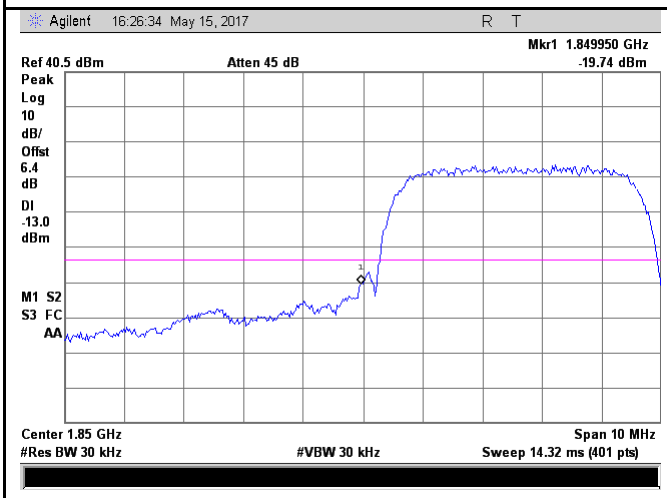
UMTS-FDD Band V - Low Channel

Note: Offset=Cable loss (4.0) + 10log (46.92/30)=4.0+1.9=5.9 dB



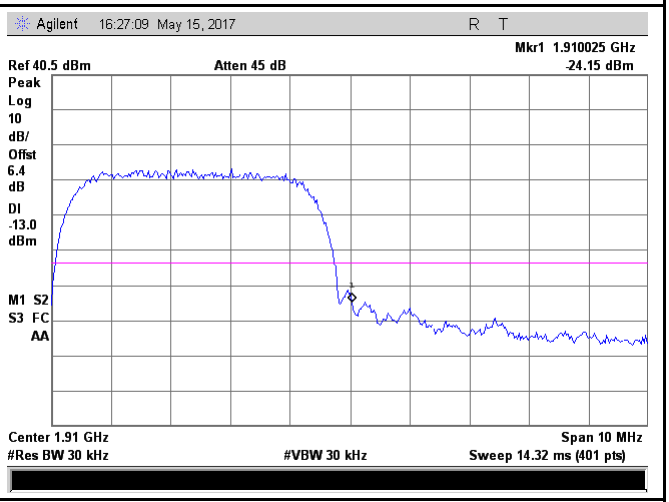
UMTS-FDD Band V - High Channel

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



UMTS-FDD Band II - Low Channel

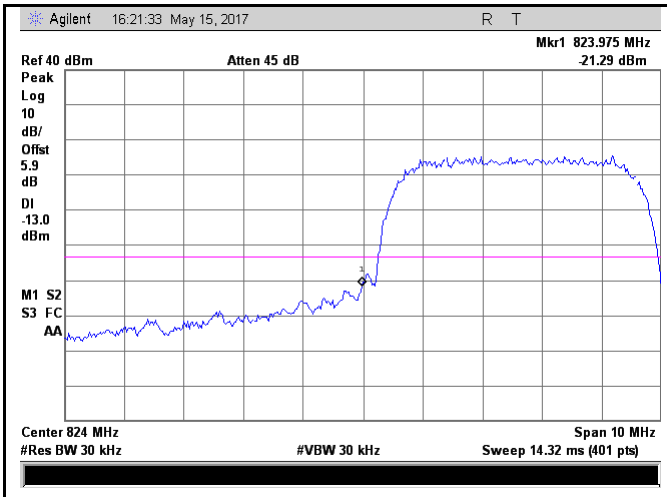
Note: Offset=Cable loss (4.5) + 10log (46.92/30)=4.5+1.9=6.4dB



UMTS-FDD Band II - High Channel

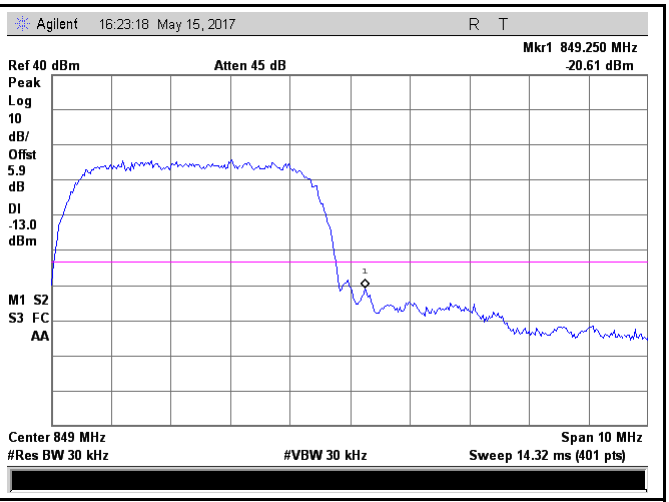
Note: Offset=Cable loss (4.5) + 10log (46.73/30)=4.5+1.9=6.4 dB

HSUPA:



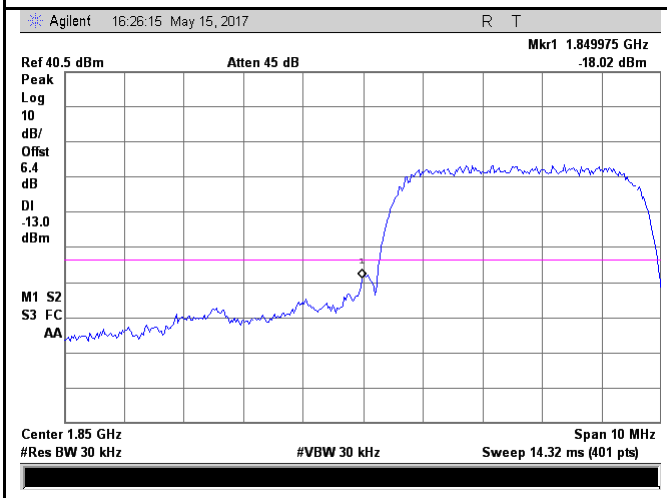
UMTS-FDD Band V - Low Channel

Note: Offset=Cable loss (4.0) + 10log (48.46/30)=4.0+1.9=5.9 dB



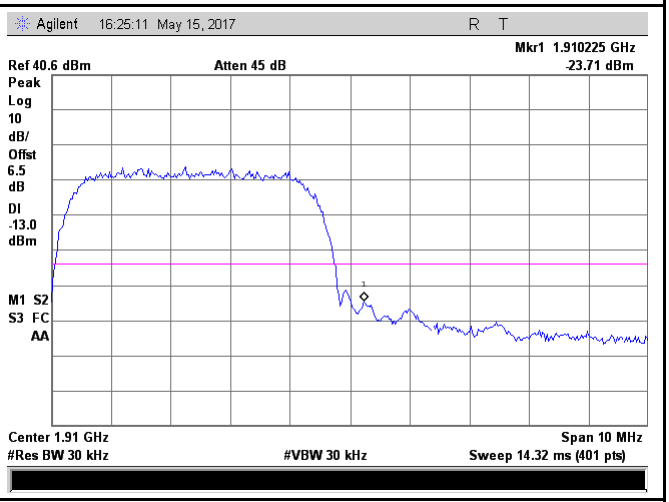
UMTS-FDD Band V - High Channel

Note: Offset=Cable loss (4.0) + 10log (48.27/30)=4.0+1.9=5.9 dB



UMTS-FDD Band II - Low Channel

Note: Offset=Cable loss (4.5) + 10log (48.38/30)=4.5+1.9=6.4dB



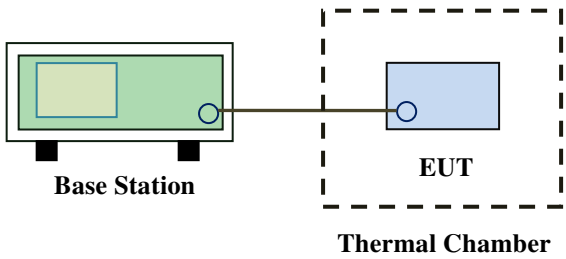
UMTS-FDD Band II - High Channel

Note: Offset=Cable loss (4.5) + 10log (48.87/30)=4.5+2.0=6.5 dB

6.8 Frequency Stability

Temperature	22℃
Relative Humidity	55%
Atmospheric Pressure	1013mbar
Test date :	May 15, 2017
Tested By :	Loren Luo

Requirement(s):

<table>
<tr><th>Spec</th><th>Item</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td>§2.1055, §22.355 & §24.235</td><td>a)</td><td>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>
<tr><th>Frequency Range (MHz)</th><th>Base, fixed (ppm)</th><th>Mobile ≥ 3 watts (ppm)</th><th>Mobile ≤ 3 watts (ppm)</th></tr>
<tr><td>25 to 50</td><td>20.0</td><td>20.0</td><td>50.0</td></tr>
<tr><td>50 to 450</td><td>5.0</td><td>5.0</td><td>50.0</td></tr>
<tr><td>45□to 512</td><td>2.5</td><td>5.0</td><td>□5.0</td></tr>
<tr><td>821 to 896</td><td>1.5</td><td>2.5</td><td>2.5</td></tr>
<tr><td>928 to 929</td><td>5.0</td><td>N/A</td><td>N/A</td></tr>
<tr><td>929 to 960.</td><td>1.5</td><td>N/A</td><td>N/A</td></tr>
<tr><td>2110 to 2220</td><td>10.0</td><td>N/A</td><td>N/A</td></tr>
</table>
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized frequency block.</td><td>☑</td></tr>
<tr><td>Test setup</td><td colspan="3"> 
</td></tr>
</table>

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 ±0.00025% (±2.5ppm) 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_o = 836.6 MHz				
Temperature (℃)	Power Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-10	3.7	21	0.0251	2.5
0		16	0.0191	2.5
10		15	0.0179	2.5
20		13	0.0155	2.5
30		14	0.0167	2.5
40		16	0.0191	2.5
50		21	0.0251	2.5
55		20	0.0239	2.5
25	4.2	20	0.0239	2.5
	3.2	19	0.0227	2.5

PCS Band (Part 24E) result

Middle Channel, f_o = 1880 MHz				
Temperature (℃)	Power Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-10	3.7	15	0.0080	2.5
0		14	0.0074	2.5
10		15	0.0080	2.5
20		12	0.0064	2.5
30		16	0.0085	2.5
40		17	0.0090	2.5
50		14	0.0074	2.5
55		16	0.0085	2.5
25	4.2	17	0.0090	2.5
	3.2	21	0.0112	2.5

RMC:

UMTS-FDD Band V (Part 22H)

Middle Channel, f_o = 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		16	0.0192	2.5
10		15	0.0180	2.5
20		14	0.0168	2.5
30		15	0.0180	2.5
40		13	0.0156	2.5
50		18	0.0216	2.5
55		20	0.0240	2.5
25	4.2	18	0.0216	2.5
	3.2	19	0.0228	2.5

UMTS-FDD Band II (Part 24E)

Middle Channel, f_o = 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		17	0.0090	2.5
10		12	0.0064	2.5
20		11	0.0059	2.5
30		15	0.0080	2.5
40		16	0.0085	2.5
50		14	0.0074	2.5
55		15	0.0080	2.5
25	4.2	17	0.0090	2.5
	3.2	21	0.0112	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	09/15/2016	09/14/2017	☑
Power Splitter	1#	1#	08/31/2016	08/30/2017	☑
Universal Radio Communication Tester	CMU200	121393	09/24/2016	09/23/2017	☑
Temperature/Humidity Chamber	UHL-270	001	10/08/2016	10/07/2017	☑
DC Power Supply	E3640A	MY40004013	09/16/2016	09/15/2017	☑
RF Power Sensor	Dare RPR3006C/P/W	AY554013	09/16/2016	09/15/2017	☑
Radiated Emissions					
EMI test receiver	ESL6	100262	09/16/2016	09/15/2017	☑
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	08/31/2016	08/30/2017	☑
Microwave Preamplifier (1 ~ 26.5GHz)	8449B	3008A02402	03/23/2017	03/22/2018	☑
Bilog Antenna (30MHz~6GHz)	JB6	A110712	09/20/2016	09/19/2017	☑
Bilog Antenna (30MHz~2GHz)	JB1	A112017	09/20/2016	09/19/2017	☑
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71259	09/23/2016	09/22/2017	☑
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	09/23/2016	09/22/2017	☑
SYNTHESIZED SIGNAL GENERATOR	8665B	3744A01293	09/16/2016	09/15/2017	☑
Power Amplifier	SMC150D	R1553-0313	03/08/2017	03/07/2018	☑
Power Amplifier	S41-25D	R1553-0314	05/27/2016	05/26/2017	☑
Tunable Notch Filter	3NF-800/1000-S	AA4	08/31/2016	08/30/2017	☑

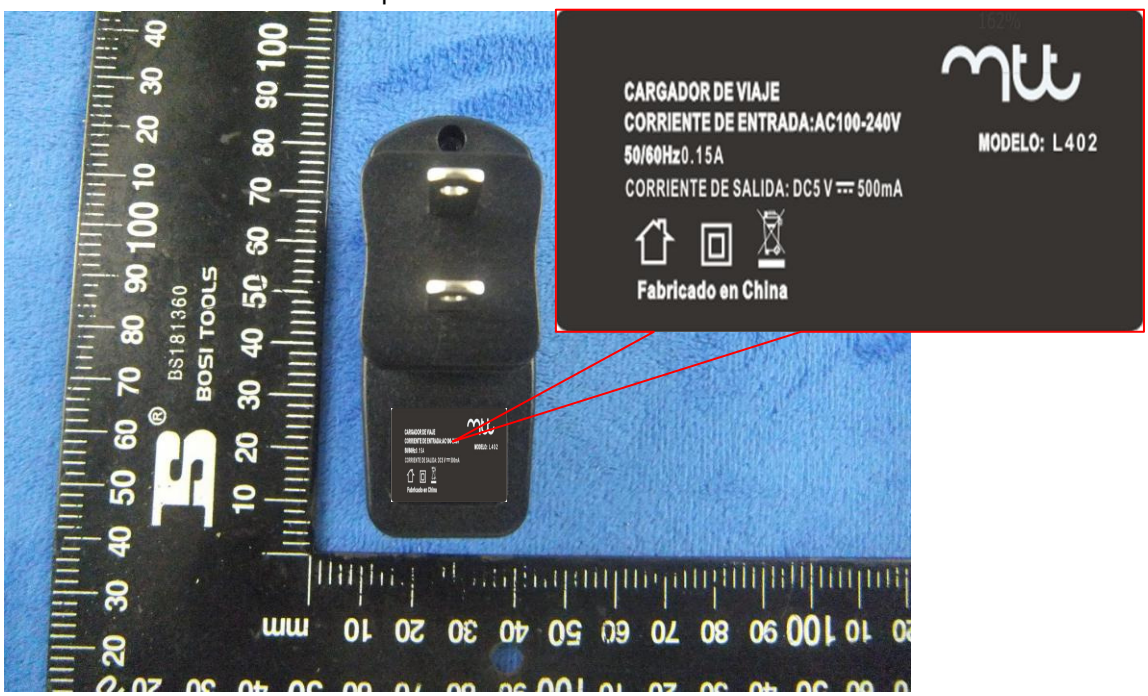
Tunable Notch Filter	3NF-1000/2000-S	AM 4	08/31/2016	08/30/2017	☑

Annex B. EUT And Test Setup Photographs

Annex B.i. Photograph: EUT External Photo

Whole Package View

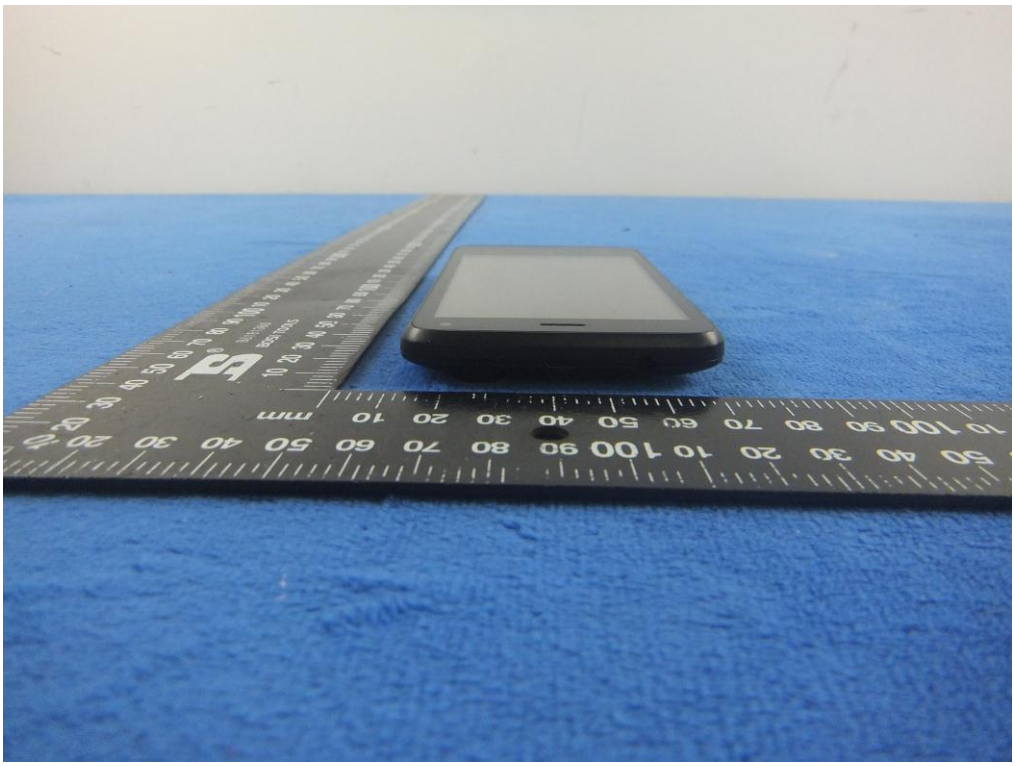
Adapter - Lable View



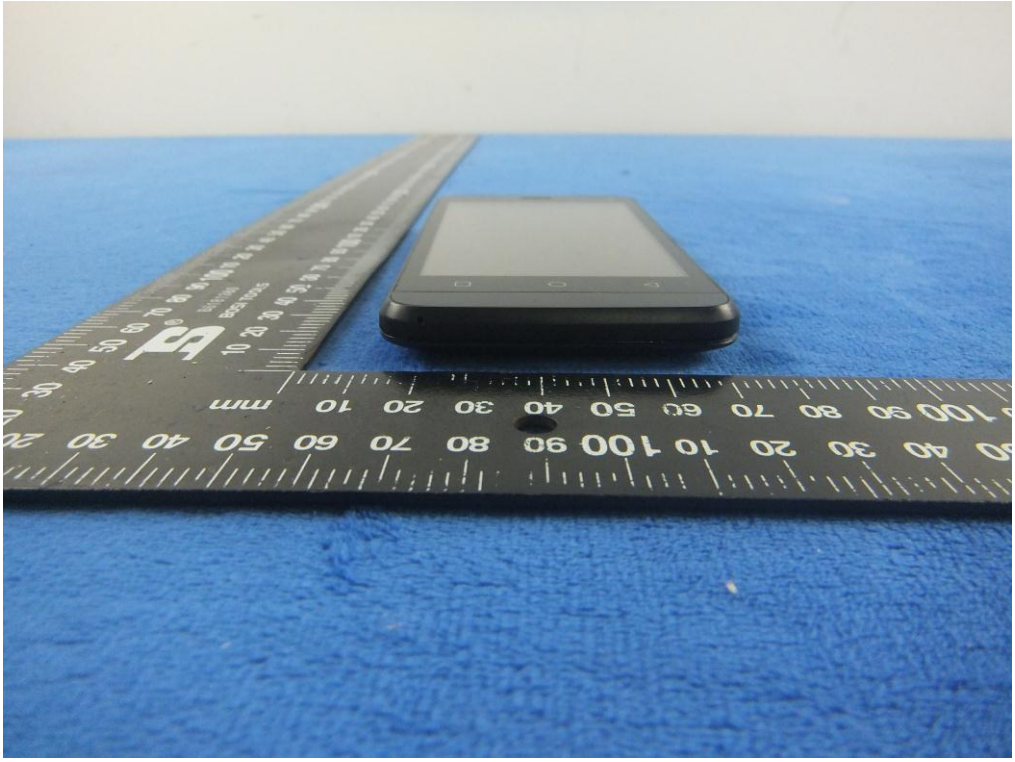
EUT - Front View

EUT - Rear View

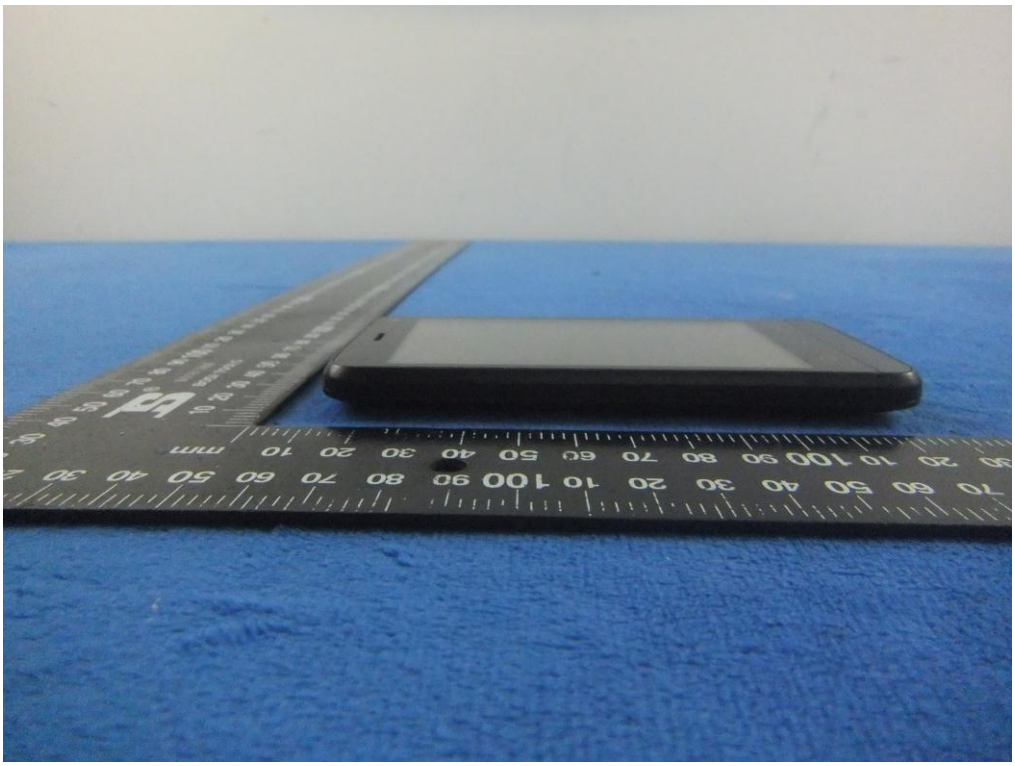
EUT - Top View



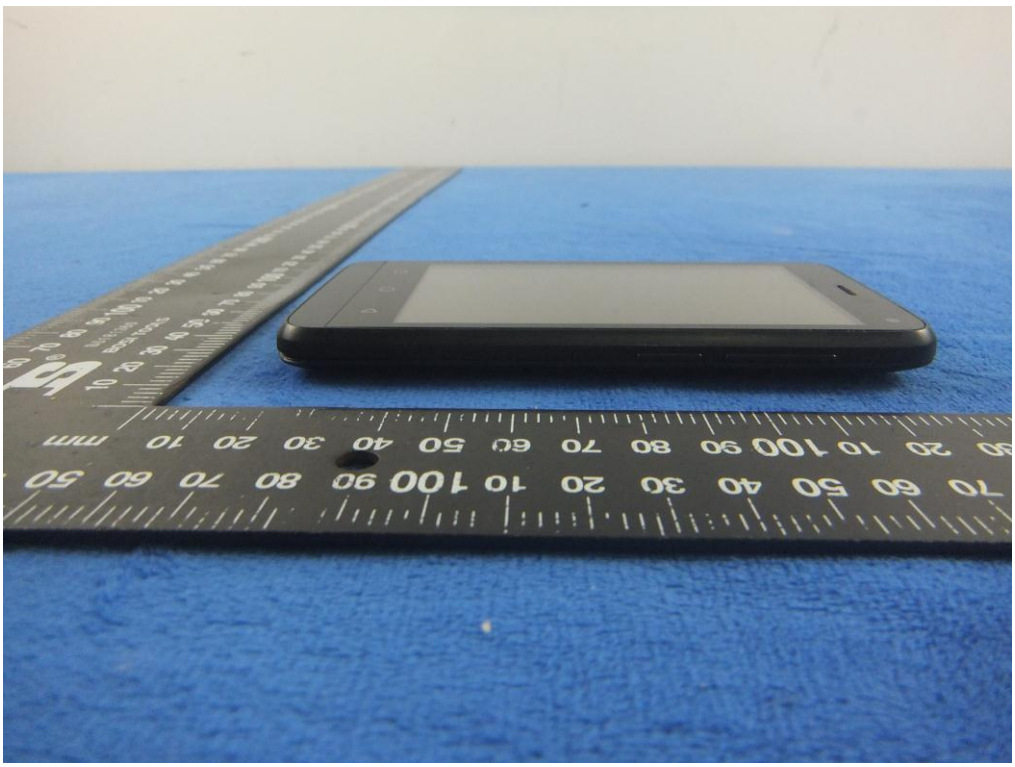
EUT - Bottom View



EUT - Left View



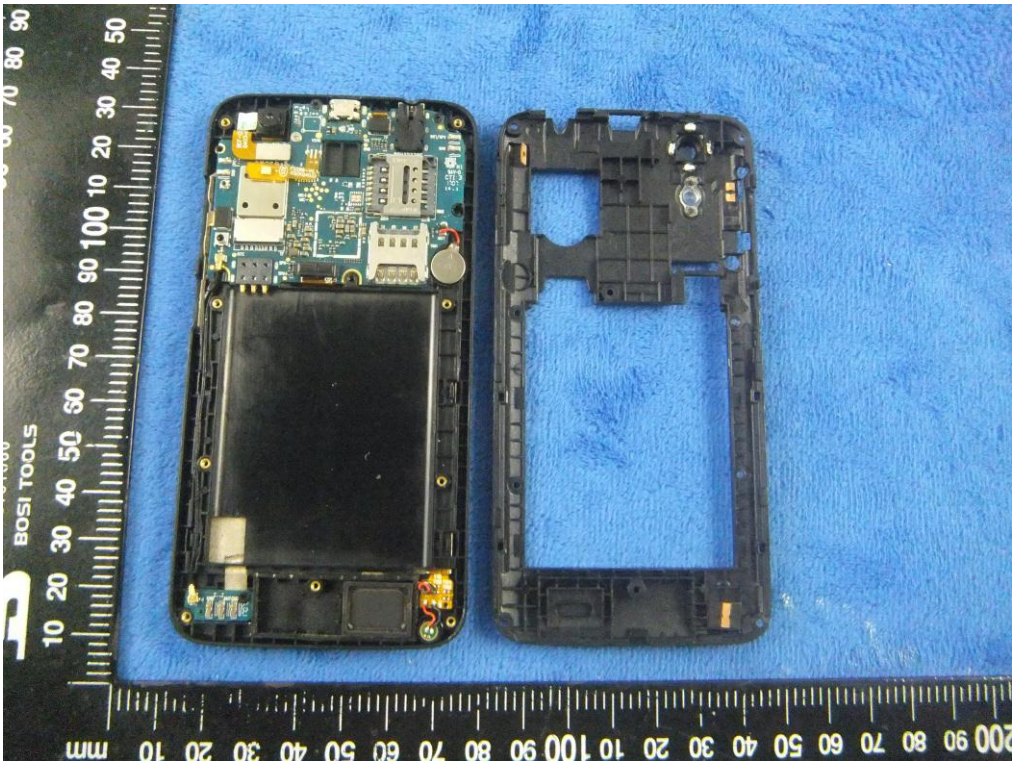
EUT - Right View



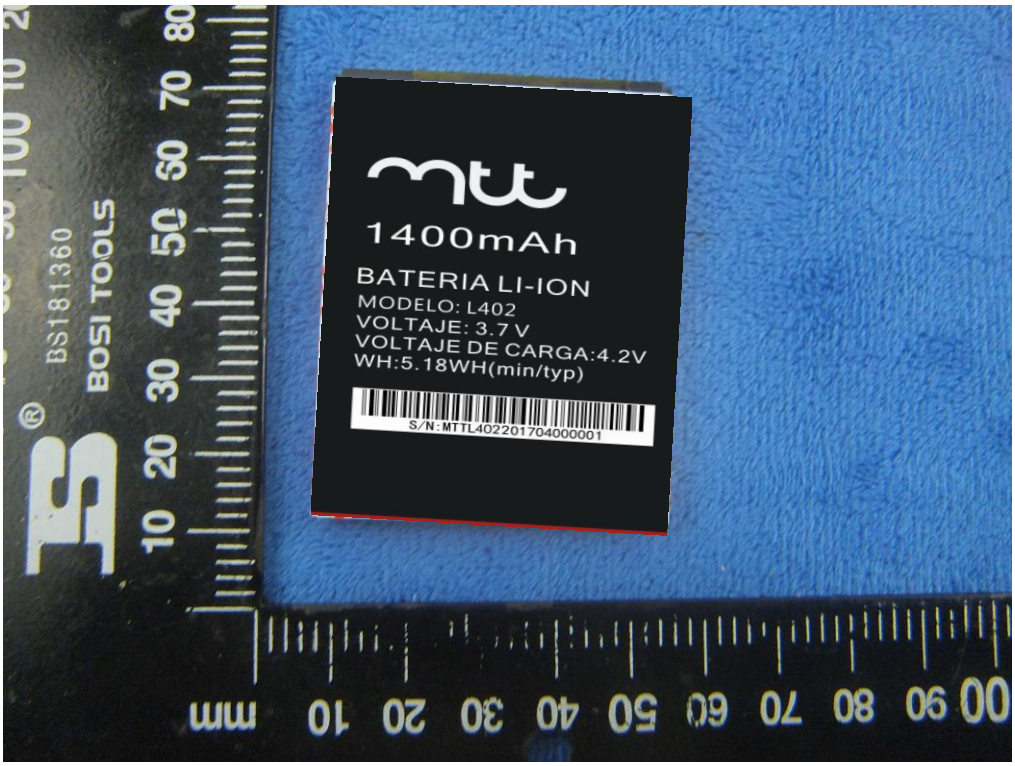
Annex B.ii. Photograph: EUT Internal Photo

Cover Off - Top View 1

Cover Off - Top View 2

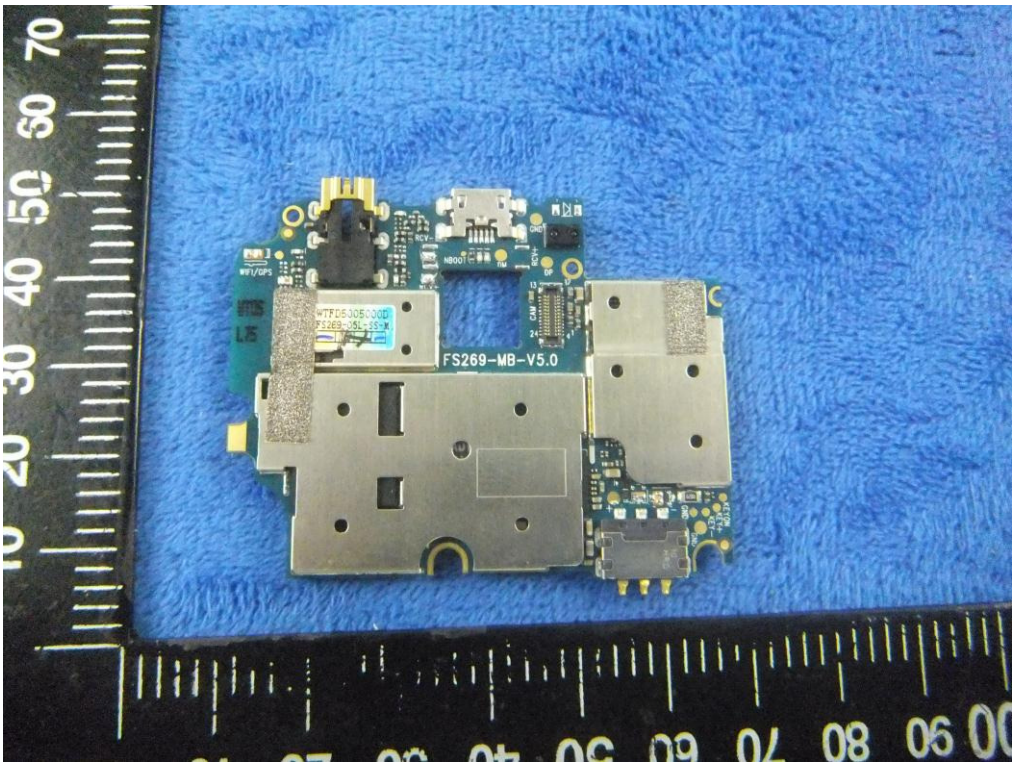


Battery - Front View

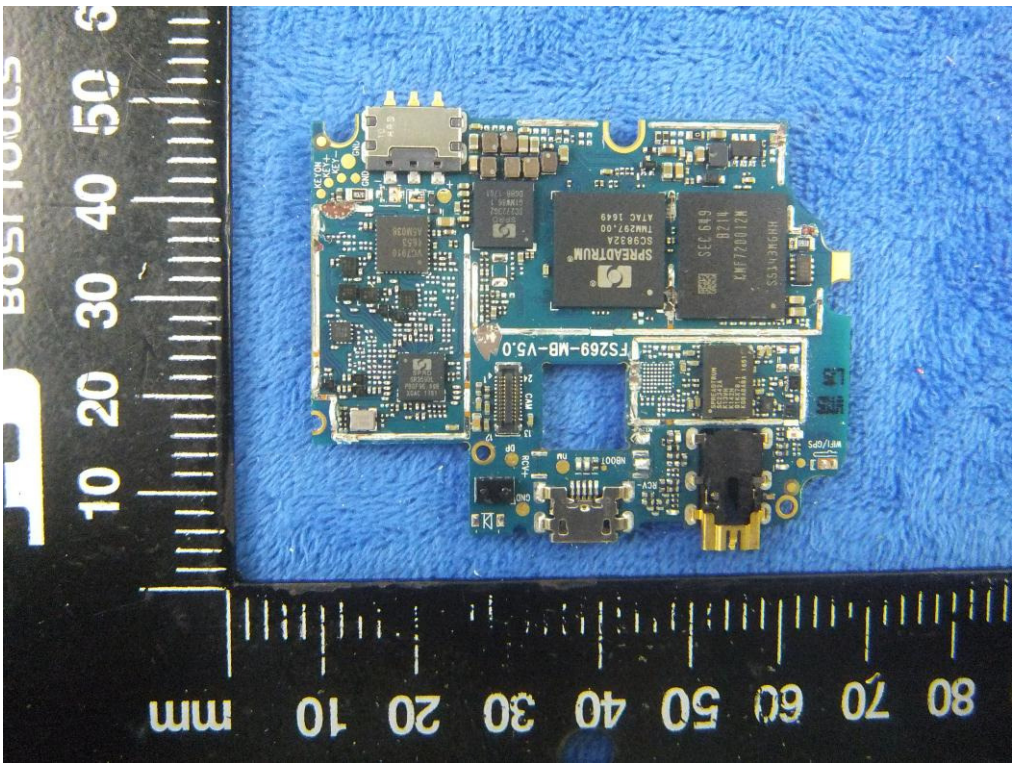


Battery - Rear View

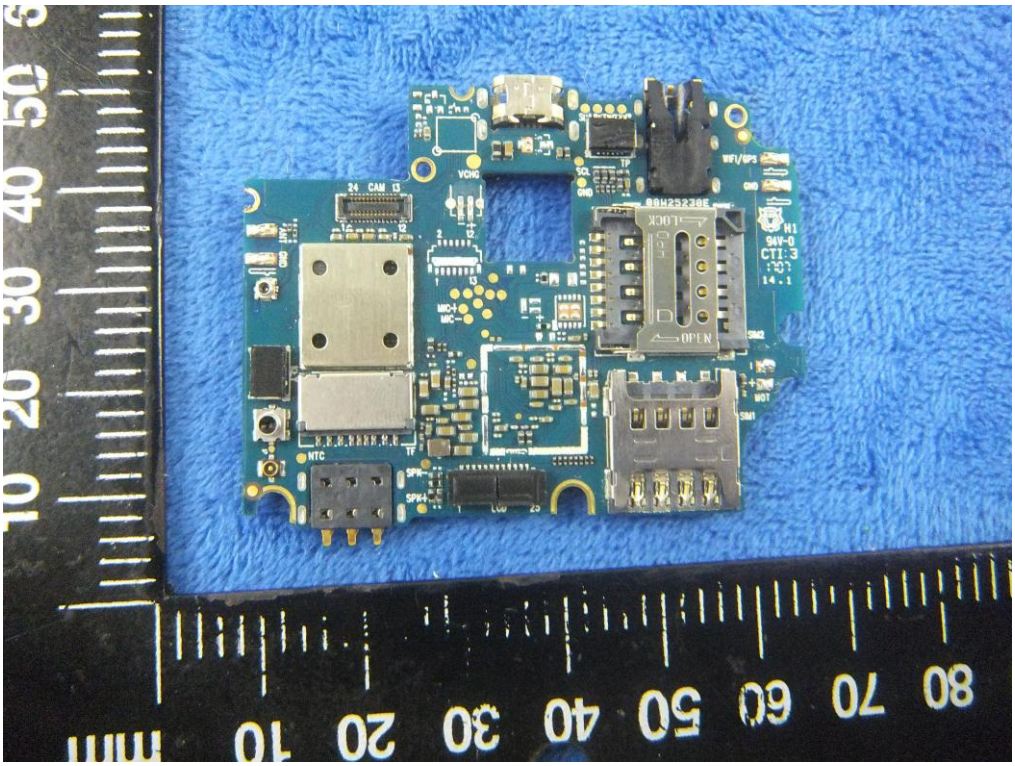
Mainboard with Shielding - Front View



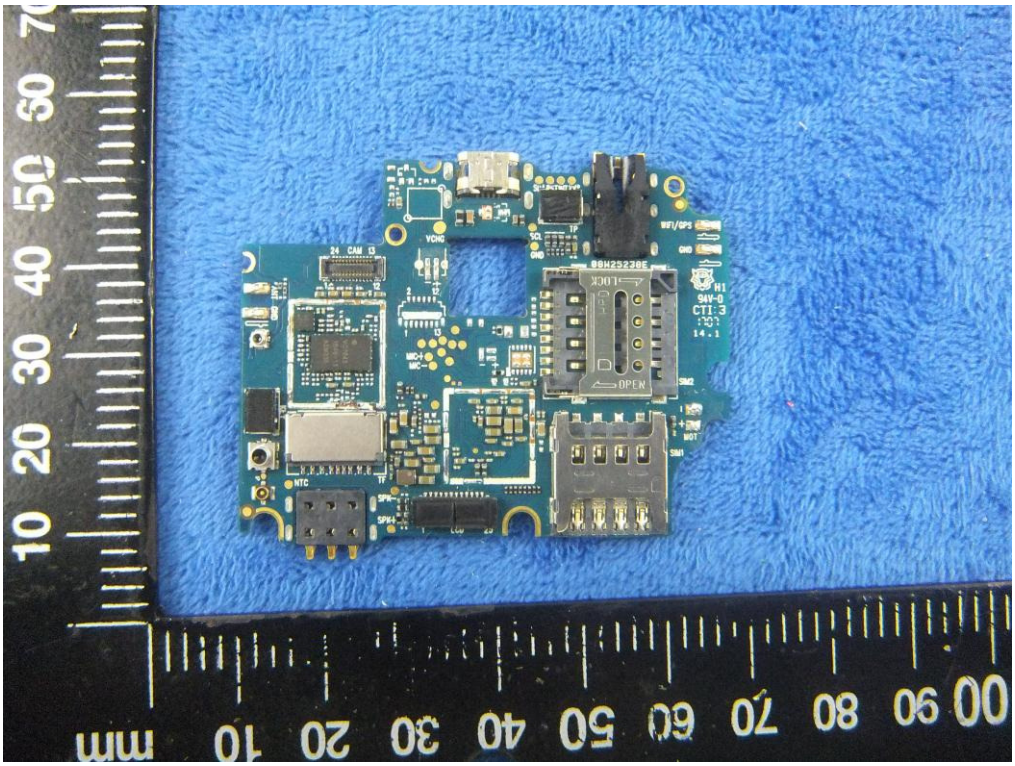
Mainboard without Shielding - Front View



Mainboard with Shielding – Rear View

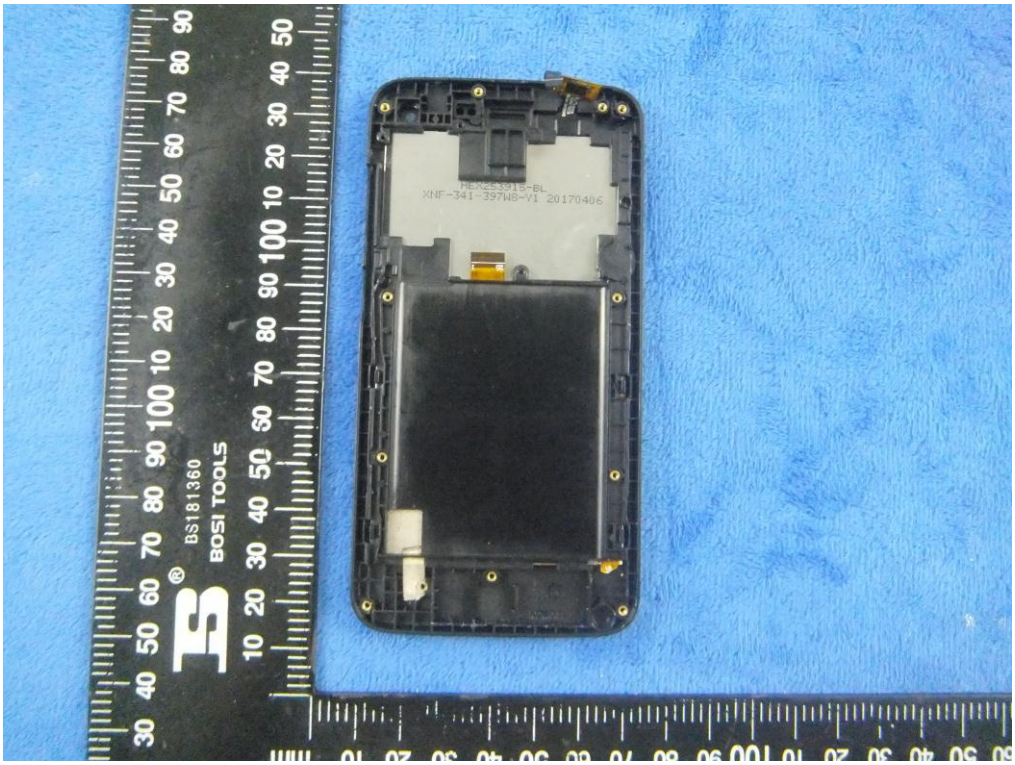


Mainboard without Shielding – Rear View



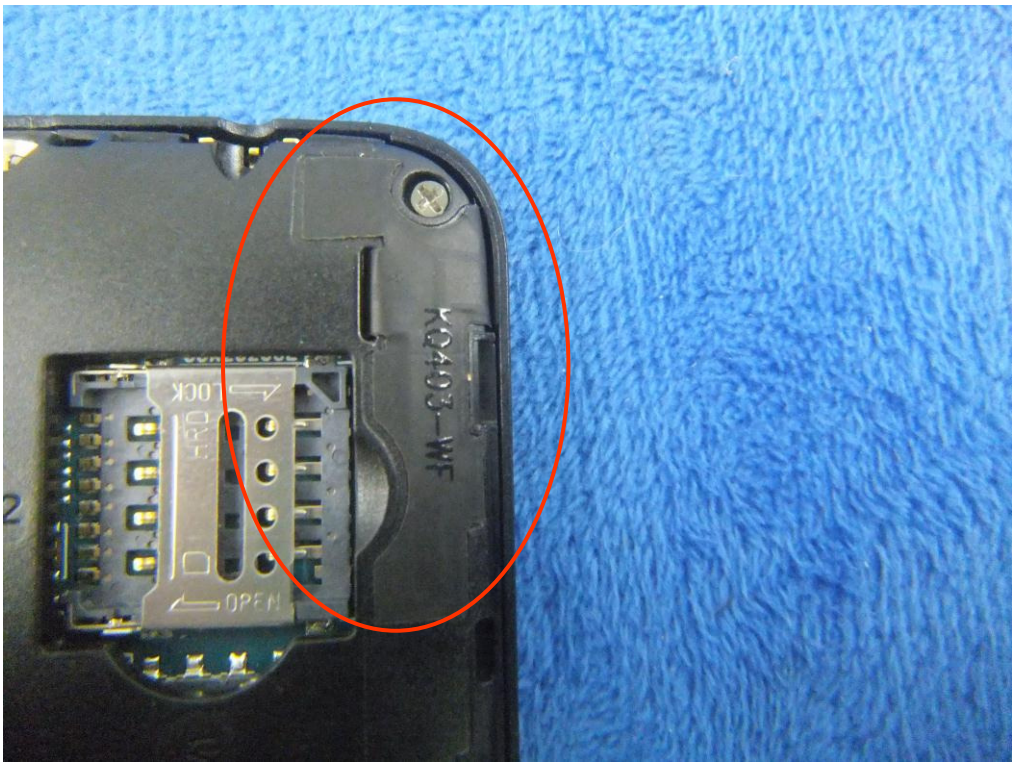
LCD – Front View

LCD – Rear View



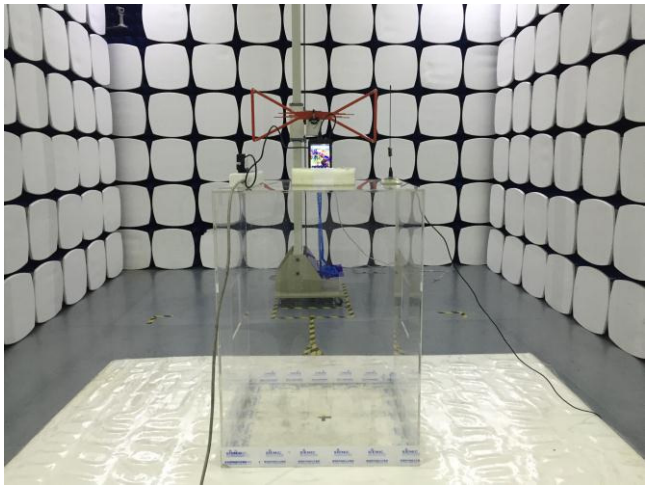
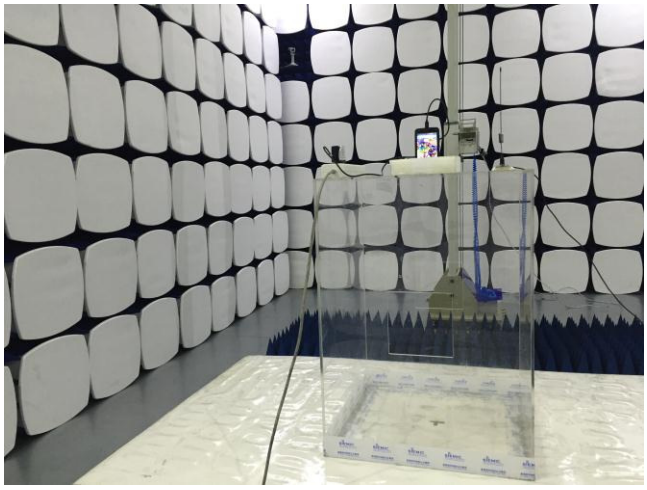
GSM/PCS/UMTS-FDD Antenna View

WIFI/BT/BLE - Antenna View



LTE - Antenna View

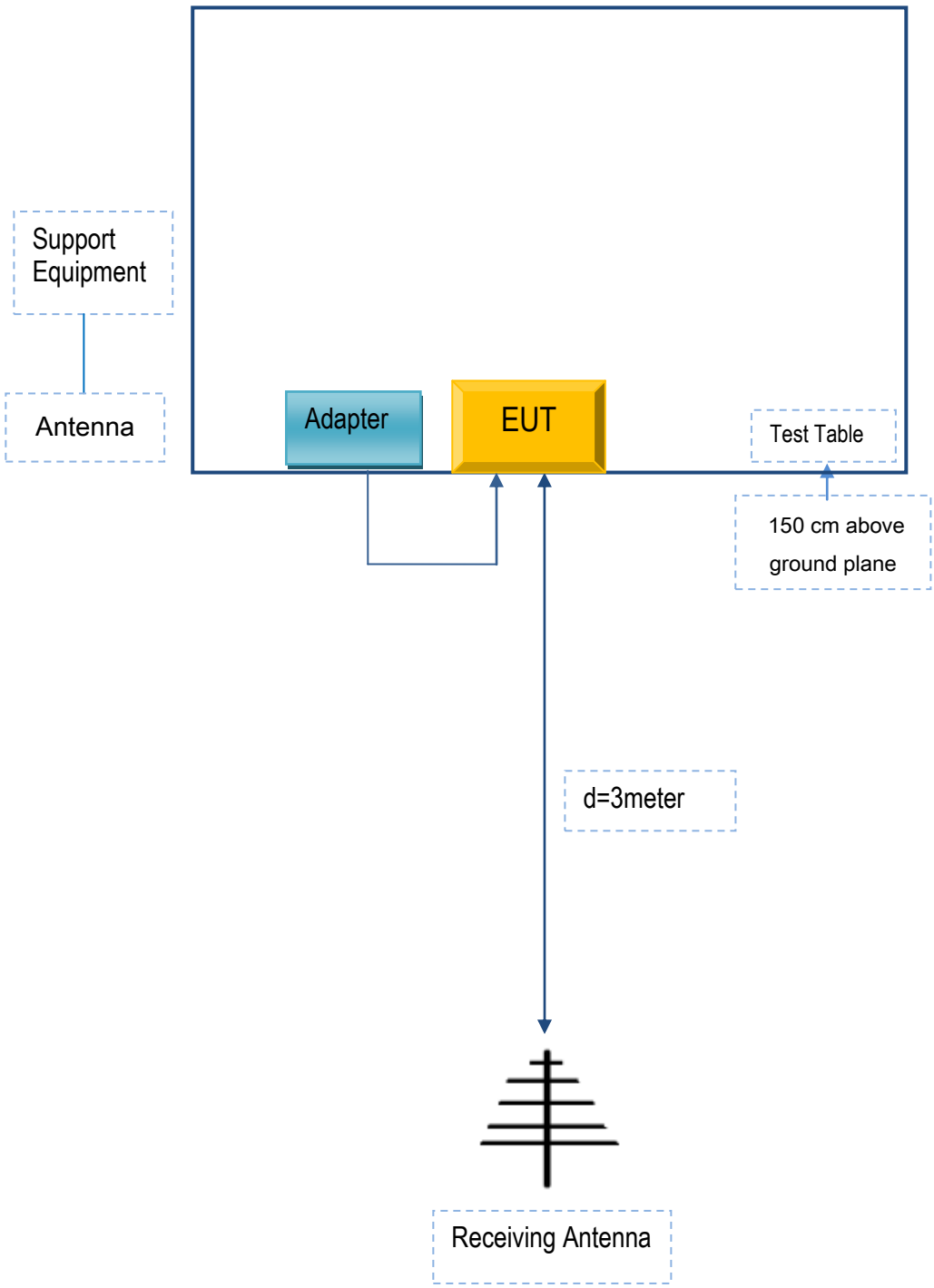
Annex B.iii. Photograph: Test Setup Photo

	
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. il. SUPPORTING EQUIPMENT DESCRIPTION

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

Supporting Equipment:

Manufacturer	Equipment Description	Model	Serial No
MOVILTELCO TRADE, S.L.	Adapter	L402	S0170303

Supporting Cable:

Cable type	Shield Type	Ferrite Core	Length	Serial No
USB Cable	Un-shielding	No	0.8m	S0170303

Annex C.ii. EUT OPERATING CONKITIONS

N/A

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

Please see the attachment

Annex E. DECLARATION OF SIMILARITY

N/A